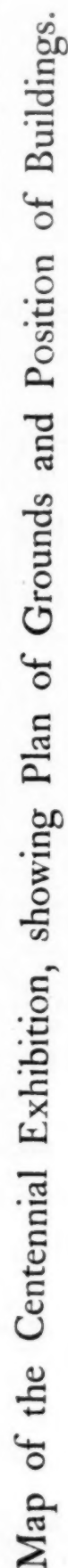


A Review of the Hardware and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 10 Warren Street, New York.

New York, Thursday, May 11, 1876.

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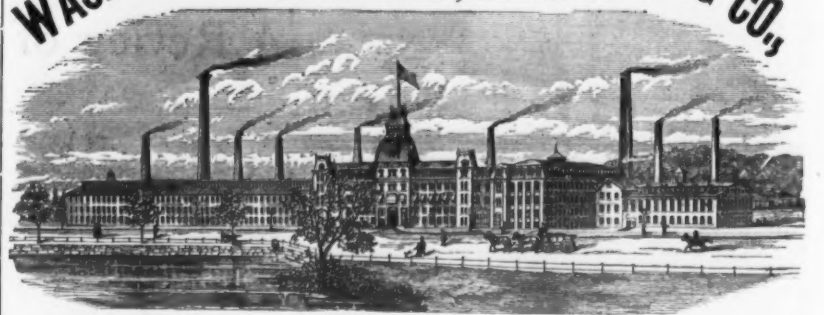
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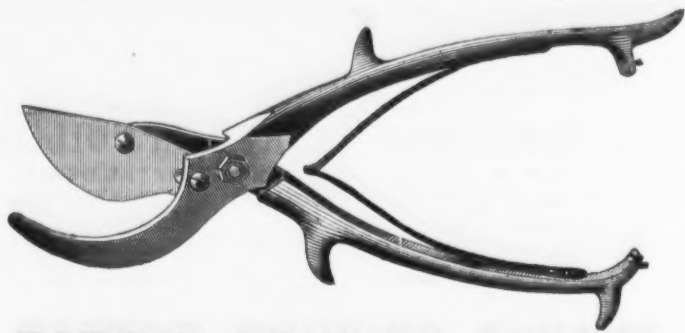
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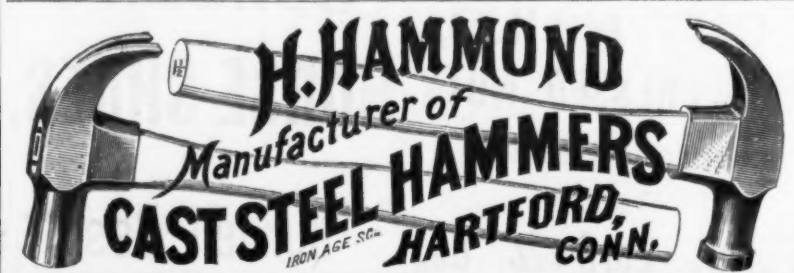
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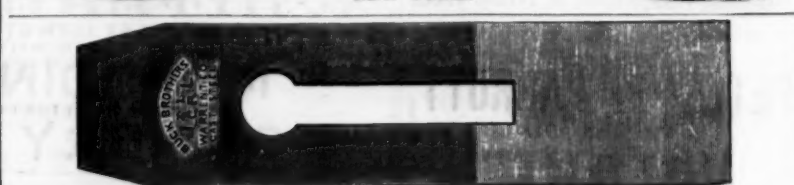
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**Practical Objections to the Metric Sys-
tem of Weights and Measures.**

Messrs. Coleman Sellers and Wm. P. Tatham,
a committee of the Franklin Institute, to whom
was referred a circular from the Boston Society
of Civil Engineers, asking the co-operation of
the Institute in promoting the adoption of
the metric system of weights and measures in
the United States, have submitted a report
which is full of interest and value. They give
a minute account of the confused system that
prevailed in France before the revolution, and
made a change appear necessary. They also
recite the difficulties that prevented the adop-
tion of the metric system by the French people.
The report then proceeds as follows:

But whatever were the controlling reasons
which incited the opposition to a change in
France, they have much greater force with us
from the absence of motive. We have no
such confusion and diversity as the French had,
and no such reform is called for. Our money
is already decimally divided, and we enjoy al-
ready the chief benefits which the new system
gave to the French.

If the measurements of the weights and the
dimensions of substances, when ascertained,
were only to serve as data for complicated cal-
culations, the reasons for adopting weights and
measures decimally divided, would have con-
trolled the practice long ago. This is actually
the case with us; in surveying land, which is
measured by chains 22 yards long, divided into
100 links; in civil engineering, when embank-
ments, excavations, etc., are measured by yards
and tenths, or feet and tenths, as the case re-
quires; in the measurement of ships for ton-
nage, when the three dimensions are taken by
feet and tenths; and in gauging casks, which
is done with a gauging rod marked in inches
and tenths.

But the fact is, that the vast majority of
weighings and measurements are followed merely
by mental calculations; or by a simple multi-
plication of quantity (whole or fractional) by
price (in decimals), a process which can often
be done by vulgar fractions, more easily than
by decimals.

The meter is really as arbitrary a standard as
the foot. About 80° of latitude have been
measured, but no two of them have been found
of the same length, and there is good reason
to believe that the length is not permanent in
the same place. The only real thing about it is
the rod in the public archives. The length of
the meter is to be recovered, if lost, by com-
parison with the length of the seconds pendu-
lum, and so likewise is the length of the foot
or yard.

The meter was adopted in France for the
lineal unit, in pendulum, only because the
harmonious proportion between the meter and
the length of the meridian would bring all
local measurements into harmony with the
measurement of the world, and would be a
great assistance in geography and navigation;
but the decimal divisions of the quadrant and
of time having been abandoned, and the adopted
length of the meter having been found incor-
rect, there remains not even a sentimental re-
ason for adopting it as our unit of measure.
Our own convenience should be our guide, and
overwhelming reasons forbid us to incur the
confusion, labor and expense of attempting to
make a change of that kind.

In the opinion of your committee, the meter
in any shape heretofore adopted, is a less con-
venient instrument for measurement than a two
foot rule. You cannot fold it into four
without breaking the sub-units. If so folded,
it would be 10 inches long, which is inconve-
nient for the pocket. The meter is only decim-
ally divided, whereas the foot rule, beside
being divided into tenths and hundredths, is
also divided into 12 inches, and gives the even
1/2, 2/3, 1-5, 1-6, 1-10, 1-12 and 1-100 of the
foot, and the 1/4, 1/2, 3/4, 1-5, 1-6, 1-10, 1-12
and 1-16 of the inch.

By changing our unit of lineal measure for
the sake of uniformity with France, we should
sever our uniformity with Great Britain, a
country with which three-fifths of our foreign
commerce is transacted.

The change in our units would entail much
greater expense than is usually imagined. The
measurements of every plot of ground in the
United States have been made in acres, feet
and inches, and are publicly recorded with the
titles to the land, according to the record sys-
tem peculiar to this country. Hundreds of
years would elapse before we could permit our-
selves to forget these old measures. Beside
this, the industrial arts during the last fifty
years have acquired a far greater extent and
precision than were ever known before. Take,
for instance, the machine shops, in which cost-
ly drawings, patterns, taps, dies, rimers, mac-
drils, gauges and measuring tools of various
descriptions for producing exact work and re-
petitions of the same with interchangeable
parts, are in common use.

It has been calculated that in a well regulated
machine shop, thoroughly prepared for doing
miscellaneous work, employing 250 workmen,
the cost of a new outfit adapted to new mea-
sures, would not be less than \$150,000, or \$600
per man. If, instead of changing the sizes, we
adopt the alternative of giving the French di-
mensions to the old sizes, the irreconcilable dis-
cord between the inch and the divisions of the
meter would furnish a precious example of the
simplicity of the decimal system.

If new weights and measures are to be
adopted, all the scale beams in the country
must be regulated and readjusted; the thou-
sands of tons of brass weights, the myriads of
gallon, quart and pint measures, and of bushels,
half bushels and peck measures, and every
measuring rule and rod of every description
throughout the land must be thrown aside, and
others, which the common mind cannot esti-
mate, must be substituted.

The great mass of English technical litera-

ture would become almost useless, and must
be translated from a language which we, and
the nation we have most to do with, understand
perfectly, into a new tongue, which is strange
to most of our people. As a question of cost
let those who advocate this change consider it
carefully.

To the teacher, to the closet scholar, to the
professional man, to those who never handled
a rule or a measure, but only use weights and
measures in calculation, it may seem merely a
matter of legal enactment; but to the worker,
the dealer in the market places, to those who
produce the wealth and prosperity of the land,
the question is a most serious one.

The Franklin Institute has never placed itself
on record as opposing true progress; it has al-
ways advocated changes which were beneficial
and not destructive. In this case a majority of
your committee believe that the ultimate bene-
fits of the change proposed, would be of less
value than the damages during the transition.
They think that the government of the United
States has already done all that can fairly be
asked of it by the most enthusiastic advocate
of the metrical system, by making it legal.
Those of us who choose to do so can use that
system, and no one can object to it; but, for
the government to require us to use that, and
no other, would be an arbitrary measure which
we are neither willing nor able to bear.

The majority of your committee are of opin-
ion, and so report, that the objections to the
attempt to adopt the meter as a standard unit
of lineal measure, are overwhelming, whether
we consider the compulsory means proposed, or
the end to be attained.

All of the objections to the metric decimal
system do not apply to the adaptation of the
decimal scale to our existing units. In the
decimal harmony between the cubic foot and
content of water weighing 1000 ounces avoird-
upois, whereby a cube of one-tenth of a foot
on the edge becomes the measure of the ounce
of water, we have the means of constructing a
decimal system of weights and measures which
would interfere the least with existing institu-
tions. But your committee do not feel called
upon to consider this branch of the subject.

Iron Art Work.

The Norwich Mercury publishes the follow-
ing description of an elaborate iron lawn pavil-
ion made for our Centennial by Messrs. Barn-
ard, Bishop & Barnard, of the Norfolk Iron
Works, Norfolk, England:

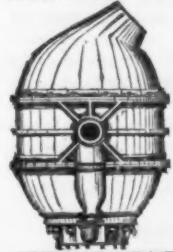
This pavilion, which is intended for use upon
a lawn, or ornamental grounds, is 35 feet long by
18 feet wide, by 35 feet high to the extreme ridge.
It is mounted upon a dias of four steps. It has
two floors, the upper of which is reached by a
spiral staircase. It is supported by twenty-
eight square columns placed two feet six inches
apart. The ornament in the shaft of these
columns is of a very rich and varied character.
At a height of seven feet six inches from the
ground a transom bar connects the columns.
The lower veranda is supported by cast iron
brackets, firmly secured to the columns. The
outlines of these brackets are in all cases alike,
but the enrichment of their spandrels is varied
by bas-reliefs, the subjects of which are studies
from the "Apple blossom, with flying birds;"
"White thorn, with pheasants;" "Scotch fir,
with jays;" "Sunflower;" "Chrysanthemum,
narcissus, daisy and grass, with a crane and
rising lark," &c., &c. These brackets further
support the gutter and cresting of lower roof.
The cresting forms a wavy line, which is sur-
mounted at intervals by fans richly carved, hav-
ing for their subjects studies from the rose,
honeysuckle, chrysanthemum, hydrangea, &c.
Between each column, beneath the transom bar,
is a richly carved pendentive ornament forming
an arch. Above the transom bar, and between
it and the gutter, are richly carved open work
key pattern panels, in which are innumerable
medallions of various designs, being studies
from butterflies, bees, birds, fish and many
other quaint and geometrical patterns. The
upper floor is surrounded by a wrought iron
balcony railing, four feet high, of a light and
severe design, exhibiting how much grace can
be produced by mere straight lines when they
are properly arranged. The upper roof is sup-
ported in its turn by twenty columns of a simi-
lar design to the lower ones. These are con-
nected by a transom bar, above which is a rich
open-work fish scale panel supporting the upper
gutter, with cresting and fans of a like character
to the lower ones. The brackets, however,
upon these columns are of a different outline
to the lower ones, and the spandrels are filled
with many designs of a bolder character. Be-
tween each bracket, both upper and lower, is a
richly ornamented ceiling of a combined floral
and geometrical pattern, the chrysanthemum
being taken as a type for its ornament. The
roof (the rafters of which are of wrought iron)
is covered with zinc, in curved tiles, and
is surmounted by an elaborately carved crest-
ing. The fascia and pendent ornament beneath
the balcony and overhanging the lower roof is
of a quaint and effective design. One of the
most important and novel features of this work
is the railing which surrounds the entire build-
ing. This is four feet six inches high, and is
entirely of wrought iron. The sunflower has
been taken as a type for its ornament. The
railing has been divided into seventy-two
panels, each of which is occupied by a sunflower
three feet six inches high, the flower itself be-
ing seven inches in diameter, having carefully
veined leaves, six in number to each flower.
The appearance of this railing is of a most
striking and unusual character, and as a piece
of workmanship is unrivaled of its kind.
Want of time has prevented the pavilion being
finished in its entirety, but it is intended, when
completed, to have a rich ceiling to the upper
and lower compartments composed of cast iron
panels in bas relief, and the upper floor will be
approached by an ornamental staircase of cast
iron. While upon examination at Philadelphia
the ceilings and the upper portions of the walls
of the interior will be covered by a silk cloth
having rich embroidery upon it, specially de-
signed by Mr. Jeckyll.

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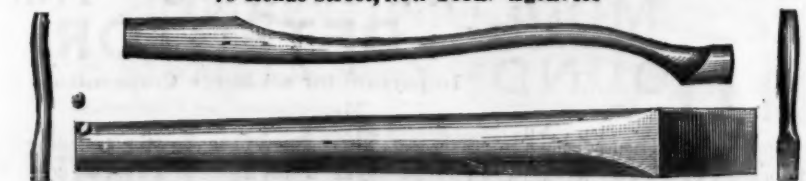
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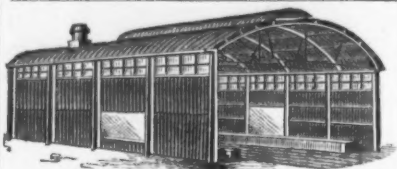
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PATENT

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Sept. 9th, 1873; Oct. 6th, 1874; Jan. 11, 1876.

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New Patents.

We take from the records of the Patent Office
at Washington the following specifications of
certain patents, lately issued, which will be
found interesting:

IMPROVEMENT IN ROTARY PUDDLING FURNACES.

Specification forming part of Letters Patent
No. 174,537, dated March 7, 1876, issued to
Ephraim A. Jones and John A. Jones, of Mid-
dlebrough, England.

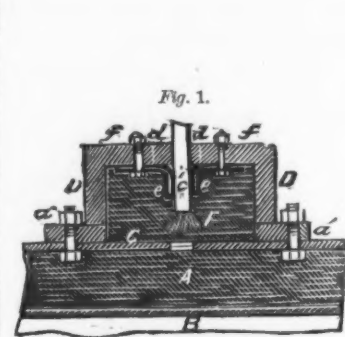
This invention relates to the construction of
rotary puddling furnaces, and to apparatus or
means to be employed in connection there-
with for supplying water for circulation around
the furnace; and it consists, first, in admit-
ting water to the water chamber or space be-
tween the casings of the furnace (when the
furnace is composed of two casings practical-
ly water-tight), in the manner and by the
means as hereinafter described; secondly, of
means for effecting the egress of the water
from the water space or chamber of the rotary
puddling furnace; thirdly, of a peculiar mode
of forming the joint at the ends of the fur-
nace.

For the purpose of admitting a continuous
stream of water to the water chamber or space

or ducts, one of which is shown at I, but any
suitable number of which may be employed;
such pipe or pipes, which are open at the end
to the atmosphere, and in communication at
the opposite end m, with the water space C,
being coiled either round the exterior of the
outer casing A, as shown in 4 drawings, or in
the water space C, one end in the latter case
passing through the outer casing A.

Fig. 4 is a longitudinal section, and Fig. 5
is an end sectional elevation, of a furnace with
the improvements which constitute the third
part of this invention applied thereto. This
part relates to an improved mode of forming
the rings, which are secured round the ends of
the rotary furnace, so as to obtain a more ef-
fective joint, and it is applicable both to
double cased furnaces, as shown in Figs. 4 and
5, and to furnaces constructed with a single
casing.

K K are the rings, which may be constructed
in two or more segments, and are secured
(one at each end) to the outer casing A in any
convenient manner; but it is better to attach
them thereto by means of keys n n, which pass
through slotted lugs o o, provided on the cas-
ing A, and enter an annular groove formed in
the respective ring K, so as to firmly maintain



between the two cases of the furnace a ring
duct or channel is employed, either attached to
the outside of the rotary furnace, and com-
posed of one or more pieces, or forming part
of the outer casing of the furnace, which ring
duct or channel, or the casing of the furnace,
as the case may be, is provided with an open
slot or passage, extending around the whole of
its circumference, in which a pipe or water
communication above the furnace is inserted,
such slot or passage being covered or protected
around its whole circumference by a band of
leather or India-rubber, or other suitable
substance, to prevent the escape of the water.
By means of this arrangement no leakage or
escape can take place at the top, where the
pipe is inserted between the packing and the
ring or duct, or the casing of the furnace, ex-
cept when the casing is full of water.

Figures 1 and 2 illustrate this portion of the
invention.

In the arrangement, Fig. 1, which is a longi-
tudinal section of a portion of one side of a
rotary furnace, the outer casing C has attached
to it, by bolts a', two rings D D, of a Z shape
in cross section, which are so placed and ar-
ranged as to leave a space between them for the
insertion of the stationary water pipe e', and to
form a chamber, F, for the reception of the
water, which is constantly introduced thereinto
by the pipe e' during the revolution of the fur-
nace with the rings D D, and is thence dis-
charged into the water chamber A of the fur-
nace. Packing rings d d and metal washers e e,
attached by bolts f f, are provided, in order to
prevent leakage from the water space F. These
rings d d work in contact with the pipe e' in
such a manner that the rings are constantly
gripping the pipe at one portion or other of their
annular sides, the other portions of the sides
successively closing behind the pipe as they re-
volve.

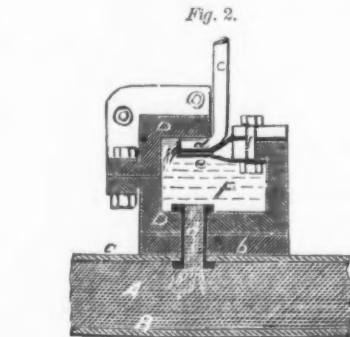
In a modification of the preceding arrange-
ment, a single ring is employed, which ring is
made hollow, so as to form the water space F,
and is provided with an annular groove on one
side for the reception of the stationary
pipe. This pipe is bent round for the
purpose of directing the water downward, and
is covered by a packing ring, which extends
round the ring D, and is secured by bolts to
the same, in such a manner as to prevent leak-
age from the water space F, the operation being
similar to that of the rings d d, Fig. 1. The
water introduced into the space F is dis-
charged into the water chamber A through
pipes, which also serve to connect the ring D
to the casing C.

A further modification of this part of the
invention is illustrated in Fig. 2, which
represents a transverse section of a fur-
nace, and a detail longitudinal section of
a portion of the same, drawn to an enlarged
scale. In this arrangement the ring is made in
two parts, D D', bolted or otherwise secured to-
gether, so as to leave a space at the outer per-
iphery for the insertion of the bent stationary
water pipe e', which is covered by the packing
ring d, the latter being protected, if desired,
by a metal ring or guard, e, attached by bolts f
to the ring D.

In lieu of employing a chamber for the in-
troduction of the water, the slot or space for
the passage of the water pipe may be made
in the outer casing of the furnace itself, in
which case the external rings D are dispensed
with.

A number of other modifications are shown
in specification, which we are compelled to
omit for want of space. A comprehensive idea
of the invention, however, can be formed from
those given.

The second part of this invention, which is
illustrated by Fig. 3, consists in effecting the
egress of the water from the water space C of
the rotary furnace by means of pipes, channels,



IMPROVED ROTARY PUDDLING FURNACE.

the ring K in contact with the casing A of the
furnace when the keys n n are tightened by
the aid of wedges p p, driven in between them
and the internal sides of the slotted lugs o o.
Each of the rings K is, according to the inven-
tion, formed with an annular recess, q, which
fits over a corresponding annular flange or pro-
jection, r, provided on the fixed ring L, which
is formed on, or attached to, the stationary por-
tion of the furnace, and against which the re-
spective furnace ring K revolves.

In Fig. 4 of the drawings one only of the
rings L, that applied to the left hand end of
the furnace, is shown. A similar ring is, how-
ever, intended to be fitted at the opposite end;
but the ring and the stationary portion of the
furnace at that end are represented as removed,
for the purpose of indicating more clearly the
shape of the ring K.

By means of the arrangement hereinbefore
described a tight junction of the rotary barrel
with the stationary portions of the furnace is

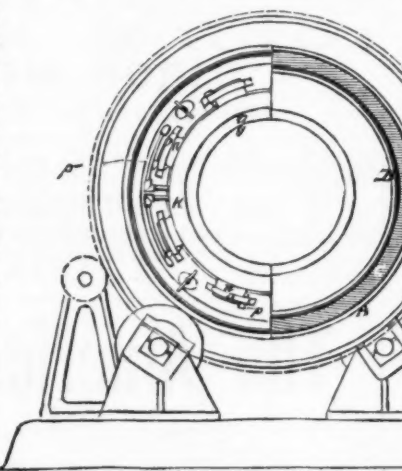


Fig. 4.

secured, and the waste of cinder and iron at
the parts where the joints occur is, consequen-
tly, prevented.

Claim.—1. The described means of supplying
water to the water space of double cased rotary
puddling furnaces, consisting of circumferen-
tial slots or apertures for reception of a station-
ary water pipe, or for the passage of water, com-
municating with the water space of the fur-
nace, in combination with bands or packing,
which, while yielding to permit the water pipe
or water to enter, will prevent undue leakage
or escape of water, the whole being fitted,
arranged and operating as shown and de-
scribed.

2. In combination with the water chamber
of a rotary puddling furnace, tubular coils or
annular channels or ducts, for effecting the
egress of the water from said chamber.

3. In combination with the revolving barrel
and stationary flanged rings of a rotary pud-
dling furnace, recessed rings intermediate be-
tween the revolving barrel and stationary
rings, engaged with, and fitted to, said parts
for the purpose of effecting the junction of the
same.

We take the following abstract of new pa-
tents, recently issued, from the official record:

TIME LOCK.

To Charles O. Yale, New York, N. Y.—March
21.—1. The combination, with a lock having an
obstruction to the unlocking of the bolt and
provided with mechanism for removing such
obstruction by hand, from the exterior of the
safe, substantially as specified, of mechanism
for checking and limiting the speed of the hand
operation.

2. The combination, with a lock having a
time mechanism and also provided with mech-

anism for removing the obstruction to the
unlocking or release of the bolt, by hand,
substantially as described, of mechanism for
checking and limiting the speed of the hand
operation.

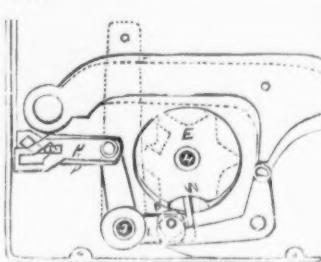
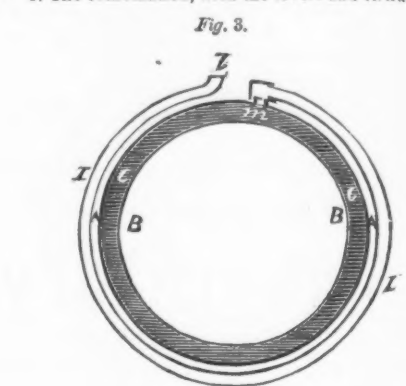


Fig. 3.

3. The combination, with the time mechanism
of a time lock and with a cylinder or its equiv-
alent operated thereby for an obstruction to,
and the release of, the bolt at a set time,
of a supplementary train of gearing, arranged
for operation by hand.

4. The combination, with such extra gearing
and the lock spindle or its equivalent, of a train
of levers, operated by a cam on the spindle.

5. The combination, with the levers and extra



gear wheels, of a clutch for engaging and mov-
ing the cylinder D or its equivalent.

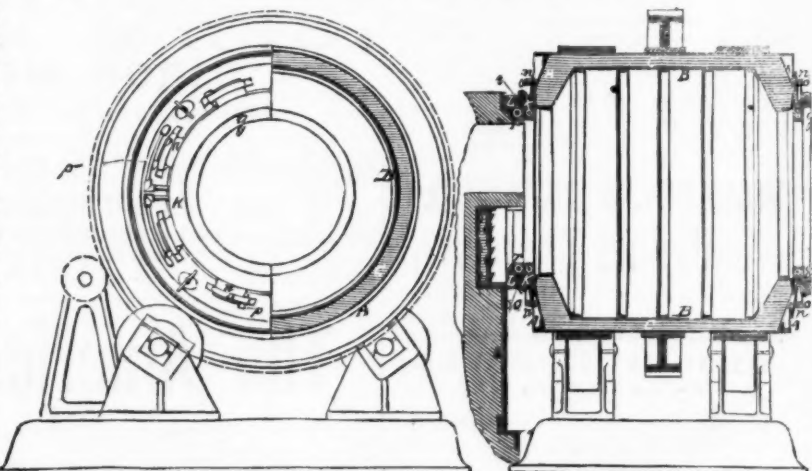
6. The combination, with the train of levers,
of the sliding slotted bars N'.

7. In a combination of gear wheels having
the number of their teeth varying, and con-
structed and arranged for operation with an
intermediate lever that forms a connection be-
tween cams on said wheels and the clutch,
whereby the cylinder D is engaged by such
clutch and moved, at long intervals only.

MAGAZINE STOVE—RE-ISSUED.

7007.—W. W. Baldwin, Cleveland, Ohio. Patent
No. 163,442, dated May 18, 1875; re-issue No.
6845, dated Jan. 11, 1876; re-issue No. 6928,
dated Feb. 15, 1876.

1. In a magazine stove, the combination,
with the converging walls of the air space,
the same forming at their lower extremity the
annular space f, of the opening C, constructed
to extend above and below the lower portion
of said converging walls.

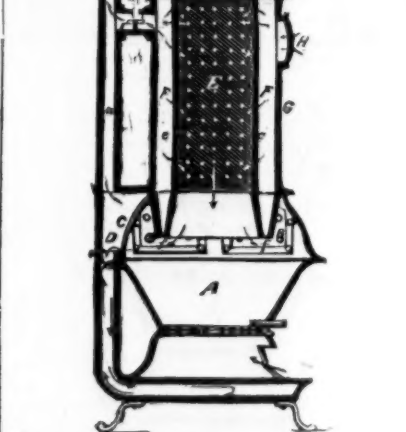


2. The combination, with perforated reser-
voir E, the perforations of which commu-
nicate directly with the air space, and the air
space F of the flue I and damper i.

3. The combination, with the perforated re-
servoir E, the perforations of which connect
directly with the air space F, of air space F,
flue I and air register H.

4. The combination, with the combustion
chamber B and perforated reservoir E, the per-
forations of which communicate directly with
the air space F, of the exit flue C and flue I.

5. The combination, with the combustion
chamber B, air space F and flues C and I, of
the air register H, by which means the draft



has direct transit through the reservoir E with-
out passing down by an indirect course.

6. The combination, with the annular air
space and the fuel reservoir, having perfo-
rated wall, of the flue I, leading to the smoke
flue D.

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 rence..... 1.50
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 termine, the charge must necessarily depend
 upon circumstances.
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 phorus in Iron or Steel..... 14.00
 For each additional constituent of usual occur-
 rence..... 6.00
 For the per cent. of Carbonate of Lime, and in-
 soluble Silicious Matter in a Limestone..... 10.00
 For each additional constituent..... 2.00
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 ible Matter, fixed Carbon, and Ash in Coal..... 12.50
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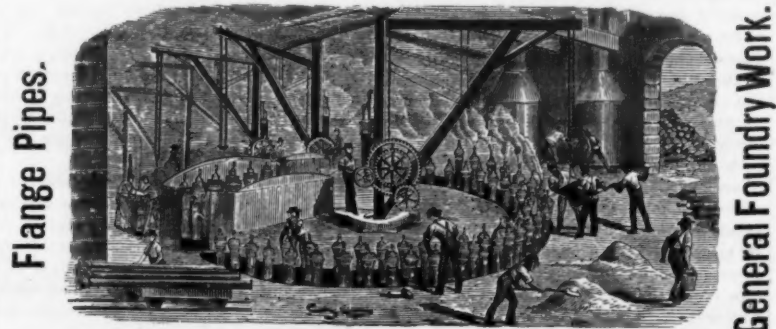
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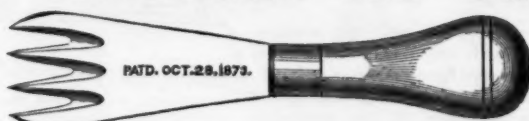
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Water Pipes.

(Continued.)

A piece of lead pipe, 0.16 inches thick, which had been in use in Hanover for conducting well water for 13 years, was found perfectly coated on the inside with a quite firmly adhering gray crust 1.83, or 0.012 inch thick, which consisted chiefly of carbonate and sulphate of lime, with some carbonate of lime; otherwise the pipe was perfectly good. An analysis of the well water, made December 1, 1875, showed that it contained the following ingredients:

	Mg. per liter.	Grains per gallon.
Chlorine.....	76	4.43
Sulphuric acid.....	139	7.52
Nitric acid.....	129	8.10
Organic matter.....	51	2.97
Lime.....	219	12.76
Magnesia.....	26	1.52
Carbonate of lime precipitated by boiling.....	210	12.21

The owner states that when the new pipe was first put in, the water was cloudy in the morning, and then became clear. It is presumable that at first the lead pipe was strongly attacked under the influence of the bicarbonate of lime, the nitrates, chlorides and sulphates, when carbonate of lime was thrown down and basic lead compounds formed, part of which remained suspended in the water, making it turbid, while another part formed the crust just mentioned, which now protects the lead pipe from further attack. At present, notwithstanding the comparatively large amount of organic matter and nitrates in the water, it does not contain a trace of lead.

Laboratory experiments, made in the manner heretofore in use, are not by any means sufficient to decide the question whether lead pipe may be safely employed for service pipe. Here it can scarcely come into consideration whether lead pipe is attacked by a certain water in the first two or four weeks, and hence, when the water has stood a few hours in the pipe, it contains traces of lead suspended or dissolved in it. It would then suffice to allow a corresponding quantity of water to run out until it was free from lead. The most important matter to be decided first is, whether the pipe is perpetually attacked. Evidently this question can only be decided by regular analyses of water from many pipes, taking particular care to observe all the relations practically occurring, which could aid or retard the solution of the lead.* Lead pipe is unobjectionable for water, which, like that of Hanover, contains mere traces of organic matter and nitrates, and, on the other hand, large quantities of bicarbonate of lime and magnesium.

Phillips observed in 1845, that lead could be removed from water containing it by simply filtering through paper; hence he supposed that the lead was merely suspended in the water. Yorke, however, found that lead in solution is held back by the fiber of the paper.

Kersting and Varrentrapp recommend the introduction of carbon filters for removing the last traces of lead. Bobierre proposed, in *Comptes Rendus* for 1873, to filter through limestone. Where lead pipe is attacked by the water, it is certainly advisable to filter through carbon.

It was first proposed to protect lead pipe from the action of water by covering with a coat of white lead paint. Christison observed that lead pipe which had been treated with a dilute solution of phosphate of soda was no longer attacked by water. Parkes confirms the protective power of the phosphates. H. Schwarz recommended treating lead pipes with a solution of sulphide of potassium, so as to convert the surface into sulphide of lead. Wilm, also, confirms its protective value.

Where a solution of lead is to be feared, sulphureted pipes may be employed, such as are used in Frankfurt, Kiel, Leipzig and Wiesbaden.[†]

TINNED LEAD PIPE.

To prevent the corrosion of lead pipe by water it was covered with tin. This is not a new invention, for tinned lead pipes were described by Ellis & Burr, in 1837. (See *Dingler*, lvi., 314.) Boettger and Von Pettenkofer believe that lead is protected from the action of water by the more electro-positive tin. Yorke found that lead was positive when in contact with iron, but when the surface was oxidized it became negative; Elsner says that lead in contact with tin is positive, and hence tinned lead pipes are very frequently strongly corroded. Pleischl lays particular stress on the statement that, contrary to the common belief, lead is electro-positive toward tin, and precipitates it from its solutions. Walkly has already reported that lead pipes are very strongly attacked when soldered with tin; he has observed a strong evolution of hydrogen in such pipes. Smith and Kersting have observed that lead which contains tin, or is covered with tin, is more strongly acted upon by water than pure lead, and Calvert also says, carefully tinned lead pipe is attacked by water. Stumpf has seen a tinned lead pipe eaten through in four weeks.

A lead pipe 4 mm. (0.16 inch) thick, used for well water, had partially remained in good condition after nearly two years' use, yet was without incrustation, but in other parts was corroded to the depth of 2 to 3 mm., and in a few places was entirely eaten through, the holes being in rows mostly in the direction in which the tubes are drawn. That portion of the pipe which dips into the water was also incriminated with numberless holes on the outside, arranged in parallel rows, but were not so deep as on the inside.

* Lead pipe is used for service pipe in Altenburg, Berlin, Bochum, Danzig, Dortmund, Essen, Halle, Posen, Rostock, Steele; lead or iron in Altona, Braunschweig, Breslau, Cologne, Düsseldorf, Hamburg, Stuttgart, Zittau and other German cities. † This is a very simple operation, it being only necessary to pass a weak solution of sulphuric acid through the pipes either before or after putting them down. It should, if possible, be left in contact with the pipe a few hours, then well washed out until the water becomes odorless and tasteless. (Ed. IRON AGE.)

The water was analyzed in October, 1874, and then contained:

	Mg. per liter.	Grains per gallon.
Chlorine.....	61	3.55
Sulphuric acid.....	125	7.29
Nitric acid.....	38	2.22
Nitrous acid.....	94	5.48
Organic matter.....	265	15.45
Lime.....	45	2.62
Precipitated by boiling—		
Carbonate of lime.....	257	14.98
Carbonate of magnesia.....	5	0.29
Total hardness.....	322	19.20

A microscopic examination revealed numerous bacteria in the form of torula and zooglea, beautifully colored organic masses and fungoid threads. Only water, which had stood over night in the pipe contained slight traces of lead, but had never shown any injurious effect on the health of the consumers. The parallel arrangement of the corroded spots permits us to suppose that the tinning has been deficient, and thus aided the destructive action of the organic matter and germs of putrefaction.*

TIN LINED LEAD PIPE.

Within a few years a so called tin lined lead pipe has been manufactured, which consists of a thin tin pipe surrounded by a strong lead mantle. According to Salbach, this kind of pipe was first introduced on a large scale in 1870, in the water works of Stassfurt, and has done well. They are also employed for private use in Vienna, Dresden and Bernburg. In handling these pipes, care should be used when it is necessary to expand them for the purpose of putting on a second piece or a cock, not to do so too suddenly, and to use a plug which tapers slowly. The spot on which the solder is to be applied is scraped clean, then moistened with acid, and the solder applied without the use of rosin or the like. The solder must consist of 4 parts lead and 5 parts tin. It is recommended not to solder such pipes with a lamp, but with a soldering iron, as the operation should be performed quickly, since, if heated slowly, the interior tin cylinder begins to melt, and is deposited in drops on the colder part of the pipe. By slowly driving in a plug, the end of the pipe can be expanded to twice its original diameter, and the expanded portion can be turned out as a flange without splitting the tin or lead.

Schmetzer states in the *Deutsche Bauzeitung* (1874, p. 180) that tin lined pipe is 30 to 40 per cent. dearer than lead of the same bore and strength. The expense of tin lined lead pipe is still further increased by the fact that old pipes and clippings of new pipes have a comparatively low value. * * * Although, from a sanitary point of view, carefully laid tin lined lead pipes are certainly to be recommended, yet there are many practical difficulties in the way of their extensive use.

IRON PIPES.

Cast iron pipes are mostly employed for the main pipes. Their great absolute and relative strength, the ease of making connections and attachments, have not yet been equaled at the same price by any other pipe material. In some cases the pipes are attacked but little or not at all, while in others they are so much injured that they can be used but a few years. Some old iron pipes that had been in use for 50 years in Cassel were as bright inside as a mirror, and on the outside had been corroded only in a few places. In Frankfurt some old pipes were taken up after 200 years, and half of the pipes were still fit for use. On the other hand, a water main at Grenoble 3200 meters long had pear shaped concretions on the inside, which in seven years reduced the flow of water from 1431 to 680 liters (378 to 180 gallons) per minute. These masses were easily removed, easily pulverized, magnetic, black, but soon turned yellow in the air. According to the analyses of Gueymard and Berthier, their composition was:

	Gueymard.	Berthier.
Sesquioxide of iron.....	55.8	58.2
Protoxide.....	8.6	21.0
Silica.....	1.3	1.3
Carbonic acid.....	1.3	5.0
Water.....	14.5	14.5
Loss by ignition.....	34.0	—
	99.7	100.0

As it could not be proven by the analyses whether the water was decomposed and hydrogen evolved, or whether the iron was oxidized by the oxygen in the water, it was supposed that the oxidation was due to galvanic action, caused by the lead rings used to make tight joints. But it must be admitted that such unions were formed on pipes without lead rings, so here there could have been no galvanic action. Similar excrescences have been noticed on pipes in Prague and Paris.

It was observed that parts of machinery were protected by cast zinc from the action of acid mine water. Bequerel believes that cast iron pipes can be protected from rust by zinc plates. Frische observed that iron was protected from rust by strips of zinc soldered on as soon as it was completely covered with water; but in moist air zinc only protects its immediate vicinity. Mallet reports that Hartley's proposition to protect iron with brass rests on an error; brass with over 31 per cent. copper, like copper alone, aid the oxidation of iron. Zinc itself only acts so long as the metal is in contact with the iron. The experiments of Hutten, on the other hand, prove that there can be no dispute about the essential protection of iron from rust by combining it with an electro-positive metal.

Hall showed, in 1821, that iron is not attacked in dry oxygen and in water free from air. Calvert says that even in damp oxygen it is attacked but little or not at all, in moist carbonic acid containing oxygen it rusts very rapidly, while, according to Payen, oxidation takes place also without carbonic acid. The same person also further noticed that white cast iron was less inclined to form these nodules than gray, while others say the contrary. Mallet is also of the opinion that the destructibility of cast iron depends on the condition in which the carbon is present, and on the homogeneity of the metal.

* It will be observed that lead is also pierced by insects.

iron. Kersting found that iron is most strongly attacked by river water and ammoniacal distilled water, and scarcely at all by water containing carbonate of soda. A. Wagner conclusively shows that iron rusts twice as fast in water containing carbonic acid and oxygen as in water free from carbonic acid, that chlorides hasten the rusting and substances of an alkaline reaction retard it.

Fournet is of the opinion that the above mentioned protuberances are formed out of the water itself, from which, owing to a loss of carbonic acid, the oxide of iron is precipitated, which then gradually attacks the iron itself. Hence their formation could be prevented by avoiding any loss of carbonic acid in the pipes. As long as this rusting of iron water pipes and the formation of these lumps remain so little understood, it is most pressing recommended to protect the pipes with a coating. Some lay the pipes in a thin milk of lime and then expose them to the air, and so form a film of carbonate of lime. Vicat had the pipes covered with hydraulic mortar, Engelhardt with cement, and Lake with cement or glass. Junker treats the pipes, under pressure, with linseed oil boiled with litharge; while Mercer, on the other hand, warns us against the use of any lead paint, as iron is then more strongly attacked than it otherwise would be. Pleischl recommended to coat the water pipes of Vienna with varnish, kind not specified. Strange to say, they are put down there without any protecting coating whatever.

It has been well known for a long time that iron may be protected by a coat of coal tar. Mallet showed that iron is best protected against the action of sea water by tar put on hot. This was employed by Kirchweyer in 1847 on water pipes laid in Hanover. Smith warned the pipes after cleaning off the rust, and immersed them in tar thickened with linseed oil and heated to 300° F. Tar is employed in a similar manner in Frankfurt, Pesth, Brunn, etc. Everywhere the process works well.

For some time past cast iron pipes have been enameled, and recently, Wittenhaus, of Vienna, has covered iron service pipes with an elastic enamel. The results of experience with such pipes are wanting.

It may here be remarked that the stopping up above mentioned can sometimes be removed by acids, but, of course, the pipes themselves may be attacked thereby. The method of cleaning the water pipes in Andernach is original, but barbaric. It has been the custom there since ancient times to have this work done by living eels,* which are put into the pipes at the reservoirs, and which come to light again at the outflow, flayed and crushed. They break loose the cubes formed in lead pipes, as well as the accumulations of sand, small pebbles, etc., and aid in floating them out.

The Chinese in San Francisco.

If the civil authorities of San Francisco, and other cities on the Pacific slope, had performed their duties in a prompt and efficient manner, instead of trying to make political capital out of "the Chinese Question," that disturbing problem of pot-house and bar-room statesmanship would no longer agitate the public mind. In the comparatively small area of ten squares in San Francisco, there are at least 25,000 Mongols, who at night are packed together as closely as Eleme figs in a box. Hundreds of the teucements crowded to suffocation by them have neither ventilation, drainage, nor sunlight, and would be in any other climate the certain generators of a festering corruption that would spread pestilence and death throughout the community. This immunity from contagion should not be allowed to foster a false sense of security. A rigid enforcement of health laws would correct many of the worst evils of Chinese immigration, and perhaps no measure could be adopted which would more effectually discourage it as to compel them to live like human beings, and observe the proprieties of civilization. In discussing this question the *San Francisco Commercial Herald* says: Their modes of life render them now a seething mass of corruption, liable at any time to become a virulent pestilence, and there can be no validity to a claim which gives them the right to maintain in our midst a standing menace to the health and lives of our people. These continual anti-Chinese gatherings, these legislative inquisitions, these never ending newspaper diatribes, these ceaseless efforts to make the subject a stepping stone to political promotion, and these daily announcements of how many are here, how many on the way, and how many more China is capable of launching upon us, are all "leather and prunella." So far there has been nothing more serious than vain gabbling. Nothing whatever has been done to make the Chinese amenable to our laws instead of to those of the Chinese six companies. Nothing has been suggested of a practical character within our reach, and nothing proposed by which the nuisance can be abated in conformity with law. Neither the Burlingame treaty nor any other instrument compels us to suffer the existence in our midst of the Chinese in a condition which imperils, not only the health and lives of other residents, but the value of property and the reputation we enjoy as a city of extraordinary exemption from pestilence of all sorts.

An explorer for Roman antiquities tells the *Athenaeum* how in 1873 he had a sewer examined, and in the course of a few minutes there were found a pugilare (writing table) in carved ivory of the third century, a bracelet cut out of jet from the Lycian River Gagas, three amphorae (flasks) of glass, a gold ear ring, seventeen coins of the largest size, "and a slight touch of typhoid fever."

* In the summer of 1874 an eel weighing 3½ lbs., and 2 ft. 8 in. long, was taken alive from a Croton by-drant in Third avenue, near Fifty-third street, New York.

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3. It is impossible for the door to be opened from the outside by removing the pins, as this cannot be done when the Butt is closed. This is a valuable feature in the case of doors opening on porches or halls.

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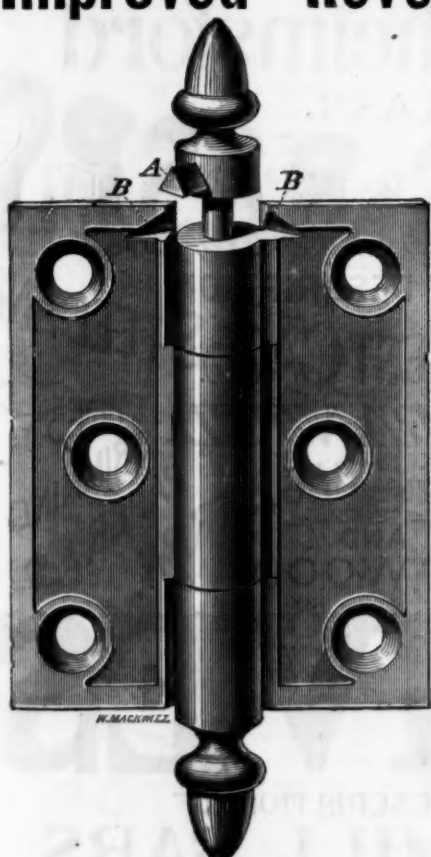
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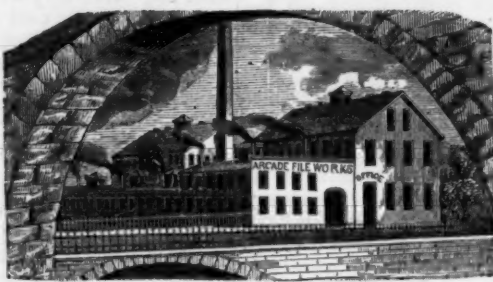


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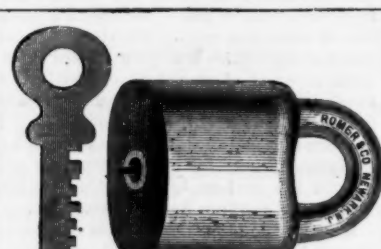
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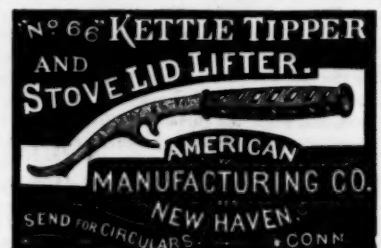
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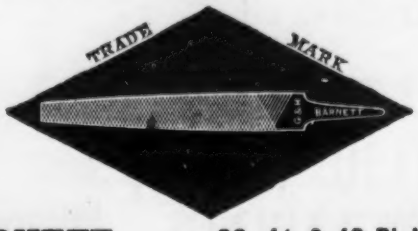
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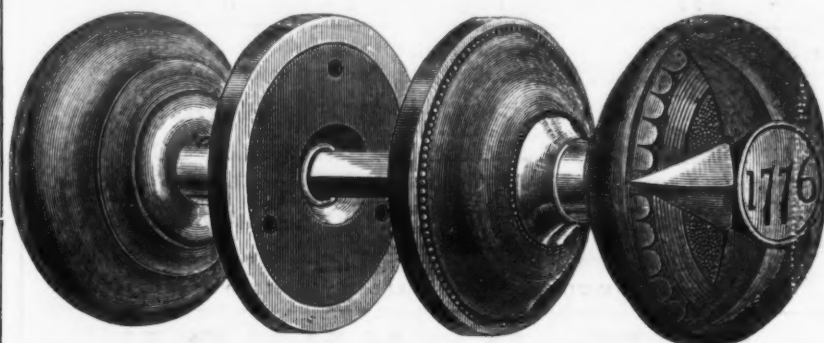
Pressed Wood Knobs for Machinery Hall, Centennial Exhibition.

We show in the accompanying illustration, one of the wood door knobs made for Machinery Hall, Centennial Exhibition, by the Ornamental Wood Company, of Bridgeport, Conn. These knobs, which are used throughout the building, were designed for the purpose by the Commission. They are made of solid white holly wood, pressed into shape in steel dies, and mounted with bronze trimmings. They are beautifully finished, and are in all respects interesting and creditable as specimens of the product of a promising, and comparatively new, industry. The design consists of a star, in the center of which are the figures 1776.

During the past few years the manufacture of ornamental wood work, by stamping and pressing, has made rapid progress, and articles of this kind have steadily grown in popular favor. Very beautiful work can be produced at a cost merely nominal, as compared with that of carving, and stamped wood ornaments are applicable to a great variety of uses in connection with cabinet and carpenter work.

Cleveland Rolling Mill Products at the Centennial.

The exhibits of the Cleveland (Ohio) Rolling Mill Co. at the Centennial contain many features of novelty and interest. The wire department is represented by the contents of 15 cases, which will contain every possible style, variety and quality of wire, one case alone containing 60 different kinds, from the coarsest to the finest, some drawn to the diameter of a



PRESSED WOOD KNOBS FOR MACHINERY HALL, CENTENNIAL EXHIBITION.

hair, and so pliable as to admit of being used as thread. Another case contains a pyramid 5 feet in height, composed of coils of different sizes and qualities. One of the curiosities in this department is a long strand drawn into the shape of a carriage whip, seven-eighths of an inch in diameter at the butt, and tapering to almost impalpable fineness. Iron, steel, copper, brass and silver wire make up the list; drawn, square, oval, round, twisted, hollow and three-cornered in shape. This display is certainly one of the finest that it is possible to make in this line. The cases in which the samples are shown are very handsome, and the general tasteful arrangement reflects much credit upon the designer.

The display in the other departments is equally as good, although not so attractive. There are, among other things, three pieces of Bessemer rail, each 7 feet long, taken from a promiscuous lot, and each twisted four complete turns without causing a flaw or break of any kind in the metal. These pieces were twisted cold.

One of the most novel and telling features of the display is in the shape of a steel rail which was laid on the Lake Shore Road over six years ago, and has been in constant service during all that time. The rail is in fair condition, and would do still further service.

Numerous specimens of Siemens-Martin steel and boiler plate, bent in every conceivable shape to show the quality and tenacity of the metal, are included in the lot; also, a great variety of forgings, consisting of points and heel points, crank pins, spindles, etc. A bar of Bessemer horse shoe steel, grooved and prepared for cutting and forming, has eight twists in its length of 2 feet, and shows no sign of flaw or weakness in any part. A 3-rail bloom of Bessemer steel completes the lot. This bloom is 7 1/2 inches square, and has been cut off by the shears at one end and broken at the other.

Bessemer Steel Horse Shoes.

The Cleveland Rolling Mill Company, Cleveland, Ohio, have recently added to their extensive works the manufacture of Bessemer steel



continuous calked horse shoes. The following illustrations show the sectional forms of two sizes of the bar, of which eight different sizes are made. The company are anxious that all interested in improvements in horse shoes should examine these goods for themselves, and give them a fair trial. We have seen testimonials from proprietors of omnibus lines and street railroads, who have had these shoes in use, which speak in very flattering terms regarding their durability and the general satisfaction which they have given. We take the following from a circular issued by the manufacturers:

SOME OF THE ADVANTAGES OF THE METAL AND SHOE.—The bars from which the continuous calked concave steel shoes are made, are now rolled, have a thin internal web, with a narrow projection on its outer edge of even thickness—the narrow projection, when the shoe is turned, forming a continuous calk, in which is the nail groove. The width of the top of the bar is a little greater than the width of the common plain iron shoes, and with the projecting ridge embraces the principle of corrugation, and while being stronger and stiffer, on account of the form of bar and material (steel), weighs fully a quarter less than common shoes of same size.

Admits of being nailed around the toe, where the shell of the hoof is thicker than any other part, and of course requires less nails at the heels or quarters, leaving this part of the foot free, neither being crowded in or out by being confined to a rigid bar of metal; therefore free to expand by pressure, and prevent contraction by confinement.

Admits of the frog, which in some respects is the most important organ of the foot, coming more readily in contact with the ground, thereby absorbing the requisite moisture, and receiving the pressure required to keep it in healthy condition and soft, as nature intended, in order that it might act as an elastic cushion to receive in part the force of the blow, and prevent injury to the internal organs of the foot and the whole system, when traveling on hard surfaced roads.

Prevents the slipping of the foot, either back or sideways, on any soil, when traveling, and with the same muscular power a horse will

travel more miles in a day than with a flat shoe. Affords greater ease and comfort when standing, as the foot is raised alike at the heel and toe, and bears all around upon the shell in a natural manner.

The internal web protects the sole from injury by contact with hard substances, also prevents balling, or cutting the feet in snow, or carrying small stones.

When properly set, it is a sure cure and prevention of interfering. No horse was ever known to interfere with these shoes, and hundreds have been entirely cured by them.

Great economy in shoeing, as the weight of the steel shoe is 25 to 35 per cent. less than is required in an iron shoe for same sized horse, and still wears much longer than iron.

The nail holes in these shoes wear much longer than iron, and do not enlarge as the shoe wears thin, and admit of resetting the shoes in very many cases when iron shoes would have to be thrown aside.

The cast off shoes make as good or better toe calks than any of the higher priced grades of steel sold especially for that purpose.

It has been found that horses doing heavy work on pavements require low toe calks on the forward shoes, and low heel calks turned up on the hind shoes; but in the country, calks are generally not required except for winter use. These shoes can be as quickly and easily calked, by using powdered borax for flux, as any iron shoes.

By all tests and experience in the use of this metal, its great superiority has been fully established. In the sale of several thousand tons of these shapes in various sections of the country, they have given universal and entire satisfaction.

The shapes or bars are now manufactured in eight sizes and put up in bundles of about 100 pounds, 10 to 12 feet long.

The Black Hills.—The evidence showing that the Black Hills are not the land of wealth and promise which they are commonly considered, is now conclusive. There is gold there, but the getting of that gold is attended with more labor and expense than it is worth, and fraud and exaggeration characterize all the reports affecting the Hills, that have been put in circulation by the merchants, tavern keepers and transportation companies of the frontier towns, notably of Cheyenne. Colonel C. C. Carpenter, who recently led an "expedition" 150 strong from St. Louis, and found the following increased to 400 at Omaha by accessions from Chicago and Kansas, has withdrawn from the enterprise and given a gloomy account of his experience. He reports extortion everywhere, from the railroad conductors who tried to charge passengers 50 cents extra for carrying rifles, to the freighters at Cheyenne, who, instead of carrying goods and baggage to the Hills for three cents a pound, as they had contracted to do, charged eight. The Cheyenne route, too—as Colonel C. C. Carpenter should have known before setting out—requires 180 miles more of railroad travel and 80 miles more of teaming, than that by way of Sydney, which he prefers, but which is likely to prove even less eligible than the Sioux City road. It may not be amiss to add that Mr. Edwin A. Curley, who was sent to this country by the London Field as a special commissioner, and just filed his opinion of his stress by his full, practical and just volume on Nebraska, is now in the Hills, and will soon report upon the subject. Whatever he may say will be entitled to confidence and respect, which is more than can be said of the sensational publications inspired by the greed of gain.

GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF

**Wood Screws, Steel in Sheets,****BAND SAWS. TOOLS FOR BRAZING, &c.**

Bed Screws, Pin Hinges, and Wire Nails a Specialty.

HARVEY W. PEACE.

JOHN HOGAN.

PEACE & HOGAN,**VULCAN SAW WORKS.**

MANUFACTURERS OF EVERY KIND OF

Patent Ground Saws,**CIRCULARS, CROSS-CUTS, MILL, MULAY, GANG, HAND, & BUTCHER.**

Molding and Planing Knives, Plastering Trowels, Mitering Rods, &c.

FACTORIES:Union Avenue, Tenth & Ainslie Sts., **BROOKLYN, E. D., N. Y.**
OFFICE & WAREHOUSE, 59 Beekman Street, New York.

E. C. ATKINS.

ESTABLISHED 1857.

H. KNIPPENBERG.

E. C. ATKINS & CO., Indianapolis, Ind.,
Saw Manufacturers and Repairers.**GENUINE SILVER STEEL DIAMOND X CUT SAW.**

\$1.50 Per Foot.

Patent Secured

E. M. BOYNTON,

Manufacturer of

All kinds of First-Class SAWS,

Saw Frames, Cross-Cut Handles, &c.

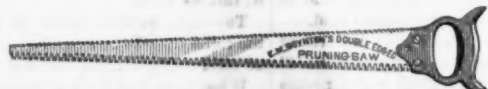
Also, Sole Proprietor and Manufacturer of

LIGHTNING SAWS.

I have received from the agent of this celebrated Steel the following:

NEW YORK, February 26th, 1876.
E. M. Boynton, Esq., New York: DEAR SIR:—Your letter of to-day is at hand covering specification of 30,000 Cross Cut Plates. I beg to advise you that I accept your offer of the 11th inst. for 30,000 Cross Cut Plates of Thos. Firth & Son's make, "of the best quality they make for that purpose," warranted. Signed THOS. FIRTH & SONS, per JERR. ABBOTT, Agent.

My Lightning Cross Cuts, made of Firth's Best Steel, will be furnished at 50c. per foot, and a reduction of 10 per cent. will be finally allowed to parties sending unsolicited cash orders during April, May and June, and maintaining prices. Champion and other varieties of Best Common Teeth Saws at 40c. per foot made of American Steel of excellent quality, warranted, with 5 per cent. discount for cash on receipt of goods.



My New Improved Double Edged Pruning Saw will cut as fast as Washington's little hatchet. Price per doz., \$7 for 18 inch. made of best steel, and guaranteed equal to any in the market. Ground 5 gauges on the back. Sample mailed on receipt of 75c.

Wheeler, Madden & Clemson**MFG. CO.,**

MIDDLETOWN, NEW YORK.

Manufacturers of

WARRANTED CAST STEEL**SAWS**

Of every description, including

Circular, Shingle, Cross-Cut, Mill, Hand,
WOOD SAWS, Etc., Etc.**AMERICAN SAW CO.,**

Manufacturers of

Movable Toothed Circular Saws,

PERFORATED CROSS-CUT SAWS

And SOLID SAWS of all kinds. Trenton, N. J.

BAEDER, ADAMSON & CO.,

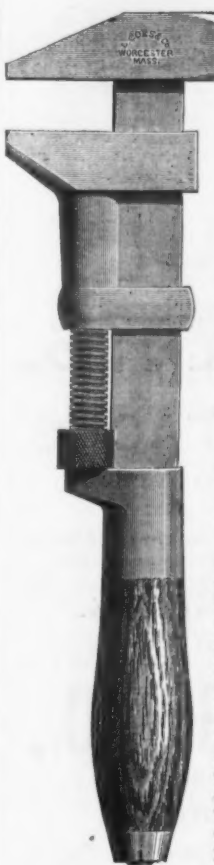
Manufacturers of

SAND & EMERY PAPER & EMERY CLOTH.

(Also, in Rolls for machine work.)

Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felt-
ing for Covering Boilers, Pipes, &c., Cow Hide WhipsPHILADELPHIA, 730 Market St.,
NEW YORK, 67 Beekman St.,BOSTON, 143 Milk St.,
CHICAGO, 182 Lake St.**L. COES' Genuine Improved Patent**
SCREW WRENCHES.

Manufactured by

L. COES & CO.,
Worcester, Mass.

We invite the particular attention of the trade to our New Straight Bar Wrench, widened, full size of the larger part of the so called "reinforced or jag bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to any strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the fact, that in 1869 we made several important improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were at once closely imitated and sold as the Genuine Wrench by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped

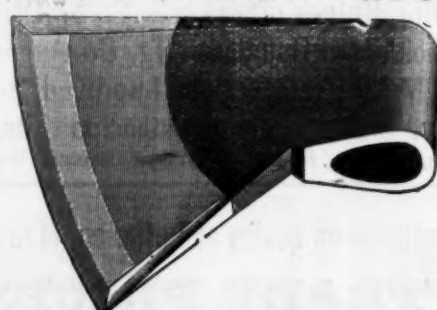
"L. COES & CO."Warehouse, 97 Chambers St., & 81 Reade Sts., N. Y.
HORACE DURRIE & CO., Sole Agents.

M. H. Jones.

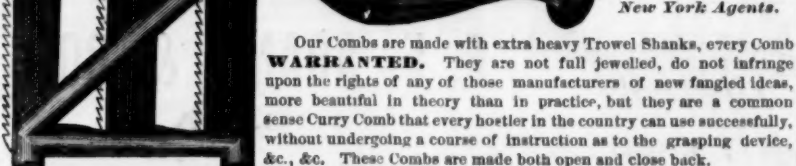
A. C. Peck.

M. H. JONES & CO.

COHOES, Albany Co., N. Y.

Manufacturers of AXES AND EDGE TOOLS.All Goods Stamped and labeled
M. H. JONES & CO.
unless otherwise ordered.Sole right to the use of the
TEN EYCK AXE MFG. CO.'S
Trade Mark.**HORACE DURRIE & CO., Agents, 97 Chambers and 81 Reade Streets, N. Y.****Curry Comb Mfg. Co**

Northeast corner High & Friend Sts.,

COLUMBUS, O.**HORACE DURRIE****& CO.,**97 Chambers Street,
New York Agents.Our Combs are made with extra heavy Trowel Shanks, every Comb
WARRANTED. They are not full jewelled, do not infringe upon the rights of any of those manufacturers of new fangled ideas, more beautiful in theory than in practice, but they are a common sense Curry Comb that every hostler in the country can use successfully, without undergoing a course of instruction as to the grasping device, &c., &c. These Combs are made both open and close back.**THE BILLINGS & SPENCER CO.,****HARTFORD, CONN.**

MANUFACTURERS OF

Die Plates and Lies, Genuine Packer Ratchet Drills, Clamp, Die and Common

Lathe Dogs, Barwick Wrench and Pipe Tongs, the

Billings Patent Sewing Machine Shuttles, Marlin

Spikes, Calkers' Tools, Clinch Rings,

Saw Sets, Screw Drivers.

And all description of IRON AND STEEL

**Drop Forgings.**

Send for a Circular.

EDWARD PHELAN,

No. 113 Chambers & 95 Reade Streets, New York,

Manufacturer of AMERICAN HARDWARE.

Coes & Tuttle's Pat. Wrenches. Coes' Nut Drivers. Maguire's Wt. Iron Goods. Whittuck's Platform Counter Scales. Yaw's Cow Bells. Axes, Picks and Hatchets.

VAN WART, SON & CO.

Hardware Commission Merchants,

EXPORTERS AND IMPORTERS,
BIRMINGHAM, - ENGLAND,

Agents,

VAN WART & MCCOY,

184 & 186 Duane Street, N. Y.

George H. Gray & Danforth,

48 India Street, Boston.

F. W. TILTON,

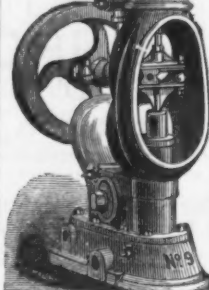
17 Old Levee Street, New Orleans.

At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

John Rimmer & Son's Celebrated**Harness and other Needles.****W. Clark's Genuine Horse Clippers.****Seydel's "Ashantee" Pocket Hammer****OSCAR IRVING VAN WART & Co.,**

FORWARDING AGENTS.

2 South John Street, LIVERPOOL.



WASHINGTON, D. C.,

Sept. 13, 1875.

JNO. MATHER,

Treas. Valley Machine

Co., East Hampton,

Mass.

DEAR SIR: The

"Wright Bucket Plunger

Steam Pump" you

built for the Govern-

ment "works like a

top." Am sure it has

never had its equal in

any of the departments,

and I have no hesitancy

in recommending this

Pump to any one in

want of a first-class,

noiseless Steam Pump.

Very respectfully,

THOS. MILLER,

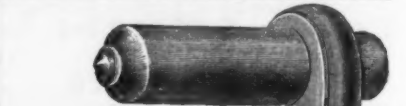
Chief Engineer U. S.

House of Representatives.

Send to us for Catalogue.

Valley Machine Co.**TIN LINED IRON PIPE.**A pure **BLACK TIN PIPE** within a wrought iron tube, combining Purity, Strength, Durability and Cheapness.**TATHAM & BROTHERS,**

82 Beekman Street, N. Y.

**Moore's Pat. Triple Acting****RATCHETS,****DRILLS & WRENCHES.****Good as the Best.****Cheap as the Cheapest.**

Price \$5.00 to \$12.00.

Foster's Combination**BELT TOOL.****IMPROVED HAND VISE,**

Patented Aug. 10, 1875.

Send for lists and discounts to

H. S. Manning & Co.,

New York.

Winn & Campbell, Chicago.**Howard, Tallman & Co.,**

Philadelphia.

Jackson & Tyler, Baltimore**Chas. Churchill & Co.,**

London, Eng.

Manufacturers' Agents, or to

Lowell Wrench Co.,

Worcester, Mass.

GEORGE FOCHT**Iron Foundry, Machine & Sheet Iron Works.**

First and Adams Streets, Hoboken, N. J.

Inventor, Pat-

entee and Manu-

facturer of the

Celebrated Self-

dumping Hoisting

Trunk, Iron, Coal

Cars, side or bot-

tom dumping.

Iron Dock and

Hook Blocks, Iron

Sheaves, with or

without Steel

Friction Rollers

for Chain, Wire or

Rope, of every

size and descrip-

tion. Iron Box

Wheelbarrows,

Coal and Coke

Barrows, Charg-

ing Scoops, etc.,

for Gas Works,

and Sheet Iron

Work in general.

Improved Mast

Shoe and Graft

Socket Castings,

and complete Iron Work for Mast and Graft made to order and put up if desired. Machinery, Building and other Castings on hand and made to order. Illustrated Circular and Price List sent on application.

BACKUS BROTHERS,

Manufacturers of

The Backus Water Motor,Cor. Wright St. and Ave. A,
Bet. Chestnut St. & S. Broad St. Depots, Newark, N. J.

What They will do.

These Motors are adapted to running light machinery, such as Coffee Mills, Printing Presses, Lathes, Drug Mills, Churns, Organs, Sawmills, etc., and every thing requiring similar power, in cities or towns where there are Water Works.

And the best "Motor" in the world for family sewing machines. Send for Circular.

TURPENTINE and ROSIN BARREL**TRUSS HOOPS.**

A large stock always on hand at lowest prices. Also full line of

Coopers' Tools

For Turpentine Trade.

Send for prices to

CHAS. E. LITTLE, 59 Fulton St., N. Y.

Cutlery.



FRIEDMANN & LAUTERJUNG,

MANUFACTURERS OF

Pen and Pocket Cutlery, Solid Steel Scissors, Shears, Razors, Russia Leather Straps, Hones, &c.

Sole Proprietors of the renowned full concave patent

"ELECTRIC RAZORS,"And the celebrated **"ELECTRIC SHEARS."** Nickel Plated Bows.

Agents for the BENGAL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.

91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

TABLE KNIVES AND FORKS OF ALL KINDS, AND ORIGINALLY EXCLUSIVE MAKERS OF



Also the exclusive makers of the "Patent Ivory" or Celluloid Knife, which is the most durable White Handle Knife known. These handles never get loose. Always call for the "Trade Mark."

"MERIDEN CUTLERY COMPANY" on the blade.

Warranted and sold by all dealers in Cutlery, and by the MERIDEN CUTLERY CO., 49 Chambers St., N. Y.

THE MILLER BROTHERS CUTLERY CO.,

Manufacturers of

PATENT FINE PEN & POCKET CUTLERY

WEST MERIDEN, CONN.

The only Knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the **Best American Knife**. We also make**NICKEL & SILVER PLATED POCKET KNIVES**

which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory, and in New York by Messrs. J. Clark Wilson & Co., No. 81 Beekman Street (who have a full stock of all patterns always on hand), and also by Messrs. G. B. Walbridge & Co., No. 99 Chambers Street.

Naugatuck Cutlery Co.,

Manufacturers of FINE

PEN and POCKET CUTLERY.

FULLER BROTHERS, Sole Agents,

89 Chambers and 71 Reade Sts., N. Y.

JOSEPH RYALS, Collinsville, Conn.,

Manufacturer of Patent



ROGERS & BROTHER,

MANUFACTURERS OF

Fine Electro Silver Plate,

Will Remove about May 1st to

690 BROADWAY.

BEST IN THE WORLD.

Blatchley's Horizontal

ICE CREAM FREEZER

(Tingley's Patent)



For Saloons, Hotels, Families or Ice Cream Manufacturers in the economy and perfection of its work, is entirely unequalled. The closed head will save ice enough in one season to pay for the machine. The tub requires but one filling to freeze. Size, 3 to 4 quart. Visitors are cordially invited, when in town to the Big Exhibition, to come and see us, or send for descriptive circular and price list. Very liberal arrangements made with the trade. The machines can also be seen at the Centennial Exhibition, Agricultural Hall, Cor. Avenues 9 and N, Column letter C, No. 4.

JOHN CARVER,

Manufacturer of

Caulking Irons, COTTON, FREIGHT & Hay Hooks, &c
288 Monroe Street, NEW YORK.

BORAX.

We beg to offer to the trade our own well known brand of strictly pure crystallized Borax, in barrels and cases, at greatly reduced prices. Apply for terms at

CHAS. FEIZER & CO.,

Manufacturing Chemists, New York.

Cutlery.

Office of THE NEW YORK KNIFE CO.,
WALKILL RIVER WORKS,
WALDEN, ORANGE CO., N. Y., Mar. 17th, 1876.

NOTICE TO THE TRADE.

We have this day withdrawn the Agency of our TABLE AND POCKET CUTLERY from ROWE, BARCOCK & POST, of No. 130 Chambers Street, New York, and placed our goods with THE WIEBACH & HILGER HARDWARE CO., of Nos. 84 and 86 Chambers Street, New York, who will act as our Agents, where a full line of our samples and goods may be seen.

We would caution our customers against buying goods stamped "NEW YORK CUTLERY CO." sold as Cutlery manufactured by THE NEW YORK KNIFE CO., Walden, Orange Co., N. Y.

THE NEW YORK KNIFE CO.,

THOS. J. BRADLEY, Pres't.

ESTABLISHED 1852.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST MATERIAL.

WALKILL RIVER WORKS,

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.



JOSEPH S. FISHER,

No. 411 Commerce St., PHILADELPHIA

AGENT FOR

George Wostenholm & Son,

"Limited."

Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &c

AGENT FOR

WALTER SPENCER & CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

Corporate Mark

Granted 1777.

F. W. HARROLD,

Birmingham and Sheffield,

ENGLAND.

Importer on Commission

or

HARDWARE, CUTLERY, GUNS, &c.

W. SANDERS, Agent,

78 Chambers Street, N. Y.

CORPORATE MARK,



Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

ASLINE WARD,

101 and 103 Duane Street, N. Y.

"LIMITED."

GEO. WOSTENHOLM & SON,

Washington Works, Sheffield,

ENGLAND.



FREDERICK WARD & CO., Sheffield,

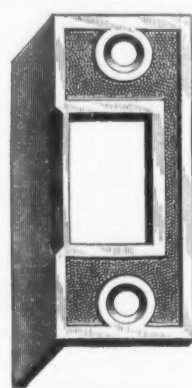
Cutlery and Table Knives.

CORPORATE MARK.



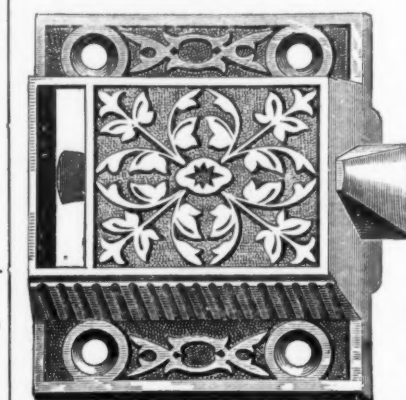
Screen Door Catches.

Last season Messrs. Sargent & Co. introduced a new catch, called a Screen Door Catch, and therewith supplied a want the trade had experienced for a catch that could be opened from both sides, suitable for screen doors with narrow stile. These catches met with such ready sale that they have added to the variety from time to time, so that now 14 different numbers are made, completely covering all necessities for that kind of fastening. The catch illustrated above is entirely new, and differs from the other numbers by the application of the lift-latch handle, instead of the knob and spindle. They claim that the lift-latch works equally well as the knob and spindle, and for some reasons is preferred, beside costing less. The increased latch has the patent triangular or V shape bolt, reverse bevel. It is made only 2 1/2 inches in width, so it can be used for very



Bent Strike.

Strike with Nos. 2430 and 2433.



FULL SIZE CUTS.—PATENTED.

narrow stile, and is applicable for doors having a thickness of 1 1/2 inch or less. The prices are as follows:

Imitation Berlin Bronze, Packed with Screws.
No. 2430, Imitation Berlin Bronze, Size 2 1/2 x 1 1/2 in., Flat Striking Plate..... per doz. \$9.50
No. 2430, Imitation Berlin Bronze, Size 2 1/2 x 1 1/2 in., Bent Striking Plate..... per doz. 9.50
Berlin Bronze, Packed with Screws.
No. 2432, Berlin Bronze, Size 2 1/2 x 1 1/2 in., Flat Striking Plate..... per doz. \$10.50
No. 2432, Berlin Bronze, Size 2 1/2 x 1 1/2 in., Bent Striking Plate..... per doz. 10.50
Discount 60 to 10 per cent. 10 per cent. extra for prompt cash.

Light Weight Tin Plates.

A writer in our intelligent contemporary, the Grocer, says that the canning trade has lately suffered great inconvenience from the fact that much of the tin plates suitable for the manufacture of cans are very light weight, ranging as low in some instances as 95 to 98 lbs. per box, when the net weight should be 112 lbs. There is no doubt that this complaint is well founded. As it is very difficult always to draw the tin sheets to the exact weight, a variation of three or four pounds is allowed. Anything from 108 to 112 lbs. is accepted as standard weight. For years such a thing as debasing the standard weight was at hand of, and a box of tin plates was considered as good as gold. Without arguing the question of the relative merits of the two systems of collecting duties on imported goods, it seems to be a fact that the standard weights of tin boxes under the ad valorem system remained unimpaired. As soon, however, as there was a change made from the ad valorem duty of 15 per cent. to the specific duty of 1 1/2-10c. per pound on tin, the idea occurred to some importers that the lighter the tin the less the duty and the greater the profit, and the better the opportunity for competition. The difficulties arising under the construction of the tariff laws as applied to the ad valorem system, and which, so far as they affected the importation of tin plate, culminated when one of our leading importing houses unhappily became involved with the government, now appear to manifest themselves in a direction in which the manufacturers and users of tin plate are concerned, and tin plate is being introduced by importers at Boston, Baltimore, Philadelphia and New York, which in some instances have been found to weigh as low as 90 lbs. to the box, and all the way from that to 112 lbs. Now, the duty being 1 1/2-10c. a pound, if the importer can have his tin plate to weigh 92 lbs. to the box, instead of 112, he saves the duty on 20 lbs., or 32 cents, an enticing profit of its life on a box. It is probable that the majority of the short weight tin sold to the packers has weighed in the neighborhood of 100 lbs. to the box, and that a comparatively small amount weighing as low as 90 lbs. has been imported. We do not say that tin plate of the weight of 90 lbs. to the box may not be useful for many purposes, nor that the importers that have ordered this short weight tin have in all cases designed to impose it upon their customers for full weight, but we do say that it is not safe for packers of vegetables and fruits in hermetically sealed cans, especially of

the larger sizes, to use tin lighter than the standard weight, unless the quality of the thinner iron used more than makes up the deficiency in strength, which may possibly be the case, and now having their attention called to it they had better examine the weights of their tin.

We are glad to learn that the importers of this city take the same view of it, and at a meeting held a few days ago addressed a remonstrance to the Tin Plate Trade Association in England, saying that they would require all tin plate to come up to the standard, and should reject all short weight goods unless the weights were branded on the boxes. This prompt action of the importers, we trust, will put an end to a bad piece of business, which, if continued, could but damage the reputation of an honorable and highly esteemed class of merchants.

From a report of the British Board of Trade



on railway accidents in 1875 it appears that the total number of persons killed on railways in the United Kingdom was 1290, and the total number of persons injured 5755. A summary of the tables given in the return states that during the year 116 passengers were killed and 594 injured from their own want of caution or misconduct. Of these 43 were killed and 105 injured by falling between trains and platforms; 19 were killed and 316 injured by falling on to the platforms, &c., when getting into or alighting from trains; 34 were killed and 35 injured when passing over the line at stations; 7 were killed and 35 injured by falling out of carriages during the traveling of trains; 44 were injured by the closing of carriage doors; and 13 were killed and 59 injured through other causes. Of other persons included in this division, 66 were killed and 41 injured while passing over railways at level crossings, viz., 38 killed and 28 injured at public level crossings, 10 killed and 4 injured at foot crossings, and 18 killed and 9 injured at occupation crossings; 248 were killed and 185 injured when trespassing on railways; 25 persons committed suicide by throwing themselves on the lines in front of approaching trains, while of other persons not specifically classed, but mostly private people having business on the companies' premises, 52 were killed and 105 were injured. There have also been reported 14 failures of machinery of engines, causing injury to 2 servants; 475 failures of axles, injuring 5 servants; 6 failures of brake apparatus, causing injury to 8 passengers; 7 failures of ropes used in working inclines, injuring 2 servants; 5 failures of tunnels, bridges, &c., injuring 1 servant; 476 broken rails, with injury to 1 servant; 8 cases of fire at stations, resulting in injury to 1 passenger; 112 failures of wheels, and 88 instances of the flooding of railways, not involving personal injury; and 36 other accidents, which caused injury to 33 passengers and 5 servants.

A railway, of a meter gauge and 24 1/2 kilometers—about 15 miles—long, is now being constructed in Switzerland, between Winkeln and Appenzel, by Hellsau. On account of the disturbed surface, very sharp curves are necessary, sometimes of only 90 meter- (4 1/2 chain.) radius, on gradients of 1 in 25. The rails weigh 23 kilograms per meter run—about 50 lbs. a yard; and the whole cost of the line, including rolling stock, is estimated at 120,000 francs per kilometer—£7724 per mile. The rolling stock consists of tank engines weighing about 19 tons, and wagons holding 6 tons. One section of the line was opened for traffic last June.

The following letter was lately received at the Branch Mint, at Birmingham, England:

To Messrs. HEATON & SONS: I had a penny which had two heads upon it, and I have given it away in mistake. I would like another one, so if you will cast two for me, one with two heads and one with two tails. I have enclosed four stamps, and if it is not enough I will send a few more for your trouble. Let me know by return of post if you can supply me, and oblige,
PETER REID, Bridge of Caley, Glasgow.

N. B.—It is for tossing with I want them, and I will pay the postage for them.

The letter was forwarded to the Mint in London.



SEND FOR
Illustrated Catalog

H. D. SMITH & CO.,

Plantville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

11 Warren Street, N. Y.

H. B. NEWHALL,

Agent for the Following Companies:

EMMET HAMMER CO.,

Manufacturers of all kinds of

Hammers and Sledges and Contractors' Tools.

H. B. NEWHALL, Agent.

All our goods are branded "E. F. EMMET & CO., Brooklyn, N. Y." None genuine without the above brand.

MACHINIST Ball, Straight and Cross Pene Hammers.

BLACKSMITH, Hand and Riveting Hammers.

Chisels. Sledges, Swages, Fullers, Flatteners, hot and cold

HORSE SHOEERS' Turning and Shoeing Hammers, Sledges, Pincers.

MINERS' Striking and Drilling Hammers.

QUARRY Sledges, Macadamizing Hammers.

MASONS' Hammers, Brick Hammers.

BOILERMAKERS' Riveting and Flogging Hammers.

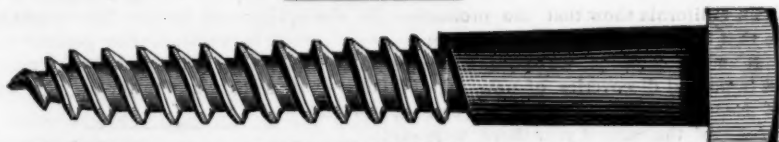
COOPER'S Hammers, Drivers and Stakes.

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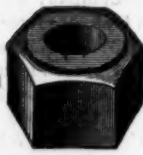
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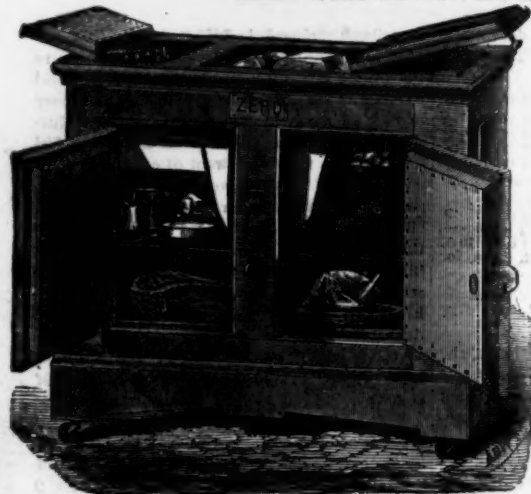
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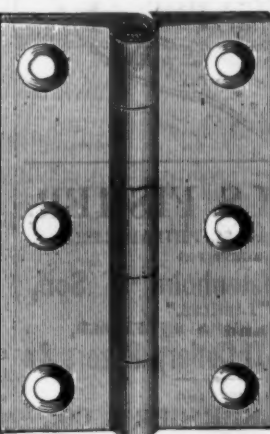
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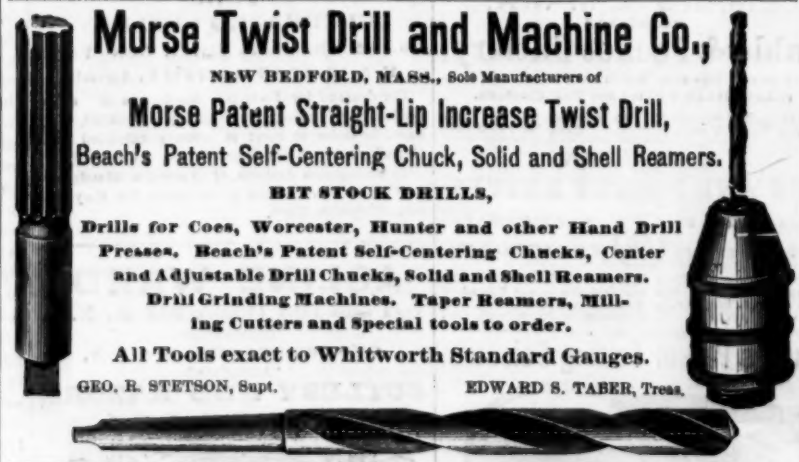
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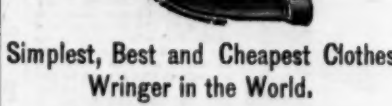
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Forty-fifth Page.—Chicago, Boston, and St. Louis Hardware and Metal Prices.

The Centennial and its Benefits.

As we go to press, we receive by mail and telegraph reports of the ceremonies and celebration attending the opening of our Centennial Exhibition to the public. As an account of the sights and scenes of the day will be found in other columns, we do not need to review them here.

Fortunately for us as a people, we have no reason to apologize for the entertainment to which we invite the nations of the world. The work of the United States Commission has been done vigorously, and, although not fully completed, we can say that it has been done well. Under the able management of Director General Goshorn, the progress of the gigantic work of preparation has been very uniform; and when we consider the enormous and unexpected difficulties encountered by the Commission in raising the money by public and private subscription—difficulties which would not have existed in times of

greater general prosperity—the fact that the Exhibition is so nearly ready to open at the time appointed, entitles it to rank among the greatest productions of American enterprise.

It is too early to say whether the vast outlay upon buildings, grounds, &c., will be repaid. If not, we shall have no reason to regret the venture. The incidental benefits to result from the Exhibition will so far exceed the sum of any possible present profit which can be reaped from the investment, that the latter becomes of wholly secondary importance in the estimation of thinking men. We certainly hope that none of the great expectations which have been formed by those interested in the enterprise as subscribers, projectors or exhibitors, will be disappointed, and we are quite certain that those which are reasonable will not be. Industrial exhibitions are of great benefit as public educators. From this one we shall learn something of the nature and breadth of the foundations upon which rest our claims to industrial and commercial greatness; by it we shall see whether we have earned the right to assume a place among the great nations of the world. All sections of the country will be brought into close sympathy by a common pride in a great and creditable display; local prejudices and sectional jealousies will be softened by a general commingling of all the elements which have united to make the American people; the sluggish pulses of trade will be quickened by the circulation of hoarded millions; and we shall gain not a little of healthy enthusiasm over our country and our institutions by prolonging our Fourth of July from the 10th of May to the 10th of November. We have become a little cynical of late. The great war and its attendant train of inevitable evils—such as reckless speculation, a lowering of the standard of public and private morals, inflation, depression, the panic and resulting paralysis in all departments of industry, corruption in office, political demoralization, &c.—have unsettled the confidence of too many American citizens in the benefits of free institutions. While we wear blue spectacles we cannot be expected to see clearly what exists about us. No doubt there is a large class of intelligent citizens who entertain very serious doubts as to whether our republic is a success or a failure. We are all very apt to have morbid fancies when prices are going down and investigating committees are poking about for corruption. In a word, we are suffering as a nation from a bad attack of doleful dumps, and anything which will stir us up, make us move about, give us something beside ourselves and our business interests to think about, and loosen the purse strings of capital, will be a great blessing just now. A general national holiday jollification will be a good thing for everybody, and we could not have it at a better time than this. We earnestly advise all to go to Philadelphia who can possibly get there; and, when there, to stay as long as they can. They will come home with larger ideas, with vastly increased knowledge, and with a better opinion of America and American institutions than can be formed from observation and experience in the limited sphere of one's daily work. We need a revival of old-fashioned gushing, self-assertive, confident patriotism. Love of country and pride in its greatness are nothing to be ashamed of, even though they manifest themselves in ways which cause foreigners to smile. If the Centennial will help us to this it will be worth all it has cost us.

We cannot, however, limit the benefits of the Centennial to its effects upon our feelings alone. The material benefits should be great, and probably will be. Our manufacturers are beginning to appreciate the vital importance of securing foreign markets for their products. The changes of the past three years which have resulted in bringing down prices to, and in some instances below, a gold basis, have rendered manufacturing for export possible in competition with Great Britain and the Continent. We have the skill, the machinery, the materials, favorable conditions of soil, climate, &c.; but we have so long been excluded from participation in this trade that in but few lines of manufacture have we any large export business. During the past few years an effort has been made to increase our foreign trade, and in some directions with conspicuous and surprising success. The Centennial will attract large numbers of foreign merchants, and afford opportunities for making ventures in foreign markets which may be the beginnings of a vast increase in our exports of manufactures. The attendance from the near-by foreign markets of Central and South America and the West Indies will probably be larger than from more remote transatlantic countries, and as our principal outlet for many years to come will be

those markets, our exhibiting manufacturers will do well to cultivate friendly and business relations with such of our Spanish speaking neighbors as may visit us. It is probably true that, as a medium for profitable advertising, more is expected of the Centennial than will be realized. In depending upon its benefits solely, many of our manufacturers are making a great mistake; but a few weeks will probably correct any false impressions on this score, and we shall then better understand than now wherein the benefits of our great Exhibition will consist.

Manufactured Iron—East and West.

During the past eight weeks the merchant iron manufacturers west of the Allegheny Mountains have passed through a test that, in its results, must be highly satisfactory to them. Their tensile strength may be stamped high. We have kept our readers fully informed as to the tangible results of the meetings that have been held, including the one of last week, which will be found reported in another place. Their results may be summed up as including the stoppage of the downward tendency of iron; an advance in price; a reclassification of iron; the fixing of a charge for cutting iron to length; the adoption of a system of discounts based on the amounts of iron sold; a reduction in the time for cash discounts from fifteen to ten days; and the formation of an association on a basis that will not only make these results permanent, but will furnish the necessary opportunity for such other reforms in the future as the interests of the trade may demand. We speak of the association as a fixed fact; for, although it is not fully established, we do not believe that it will fail. All of these movements have been with an object in view—an advance in the selling price of iron—and they have not failed of their purpose. Merchant iron is selling in the West to-day at from \$5 to \$7 a ton advance over the price which could be obtained for it on the 1st of February.

But beside these positive and tangible results of the conferences of the Western iron masters, there are other and indirect results that will, in the end, be of even greater benefit to the trade. The first of these is the establishment of mutual confidence. It is humiliating, but true, that for months there has not been the least confidence in any card or price, and scarcely in any assertion which a manufacturer would make as to prices. All this is now changed, and it will be an extremely difficult matter to convince a Western iron manufacturer that any other Western iron manufacturer is cutting prices. State that his neighbor is selling at a tenth under the card, and in ninety-nine cases out of a hundred, if not in the hundredth, he will reply "I don't believe it." This confidence has resulted from investigations that have been made of rumored cutting of prices, and in every case they have been proven unfounded. As we have often asserted, it is this want of confidence that has demoralized the market, and sent prices seeking a bottom and finding none.

There is another incidental result of these conferences that is full of comfort to the seller of iron. Heretofore, when a buyer would ask for quotations, an hour would be spent in finding how much he wanted, what sizes, what proportion of "sweetening," from whom he had received quotations, etc., and then the seller was ready to quote prices. Now the answer is, "The card rate; nothing less." The number of years this will add to the average seller's life we will not calculate.

But notwithstanding all that has been done in the West, so far as the iron trade of the country is concerned, the work is but half done. The East is still at loose ends. There is no understanding between the two sections as to price, terms, etc., at which each shall sell in the other's territory. We believe that the time has come when a change could be made with advantage. We are aware that there are old sores and old jealousies in the way, but those between the East and West are no deeper nor uglier than those between different sections of the West. There were Western mill owners who had not been near an iron association meeting for years, and now they are active members of the new one. In our judgment, it is possible for the East and West, to form associations on such a basis that they can work in perfect harmony, having each respecting and maintaining the prices each shall establish in its section. So far as the card is concerned, the iron merchants in and around New York have helped this along by giving up the method of selling by the gross ton, and adopting the Western method of selling by the decimal system of cents and tenths of cents per pound. The former was the old English

method, and was always troublesome, while the latter is much better and easier. There is also another custom that had its origin in the shipments of English iron to this market, and that is the sale of Western iron at any price in Eastern markets, without reference to the card established either East or West. We believe that the West would willingly give this up if arrangements could be made by which the associations might work in harmony, and we believe they can be. Iron masters, both East and West, are getting sensible. The independent feeling that was engendered by the high prices and large profits of the years succeeding the war, has been toned down by the losses of the past few months. A man need not listen to reason when he is making half a million a year, but reason's voice will be very melodious when he is not making a cent, but wants to. The time for foolish pride is past. Old scores must be wiped out, iron masters must come together in a spirit of fairness and concession, and the future will be assured. There are some dealers we know who do not wish this. They desire the old times to continue so that the West can unload East, and thereby enable them to hold one section as a menace. We misunderstand the present spirit of the iron masters of the country if they lend themselves to any such policy. Their interests surely are identical, and if they do not make them so in reality they have less wisdom than we give them credit for.

Quicksilver.

The course of the quicksilver market has been very different this year from last, when it was subject to a number of disturbing influences. The greatest of these was the sudden and enormous increase in the production of California. It seemed doubtful for a time if the world's consumption was great enough to absorb all this surplus, except at very low prices; but, during the latter half of 1875, it was very clearly shown that between California and Nevada, on the one hand, and China, Australia, Mexico and the South American Republics on the other, an American production not materially exceeding 40,000 flasks, in addition to a Mexican production of 2200 flasks, could be maintained without oversupplying the market. This would leave for consumers in the Atlantic ports the 48,000 flasks produced in Europe and the 2000 received by Holland from Borneo.

This year the quicksilver market has been remarkably quiet, on the basis of £10 at London, 58c. to 59c., gold, at San Francisco, and 61c. to 62c., gold, in this market; yet, there is probably as much reason for an unsettling of values this year as last. Official statistics thus far received from California show that the production in that State is again considerably increasing, and, in addition, we have intelligence of important discoveries of new deposits at Reno, Nevada. During the first six weeks of the current year there were exported from San Francisco 4736 flasks, against 1341 flasks exported during the same period last year. The bulk of this large shipment was sent to China, which seems to be capable of taking almost unlimited quantities at reasonable prices. We have, however, no means of judging what may happen in that country in the course of the next few months, or what will be the result of the demonstration now making in that quarter by England, Russia and Germany. This may lead to a temporary blockade of the trade ports, causing a sudden check in the shipments of quicksilver to China; but were this event to occur, the increase in the silver product of Nevada, requiring increased quantities of quicksilver, may suffice to prevent a glut of that metal at San Francisco. In 1875 the Consolidated Virginia Mining Company reduced no less than 169,094 tons of silver ore, representing a value of \$17,209,733, and there was a large reserve of ore on hand at the beginning of this year, with a melting and assaying capacity of \$5,000,000 bullion per month. In Mexico, on the other hand, silver production is hampered by revolutionary disturbances, and less quicksilver will be required to supply the demands of that market than would be needed in time of peace.

From the foregoing it will be seen that the consumption of quicksilver is more dependent upon contingencies this year than last.

The following are the official statistics of quicksilver export from California, by sea, during the three years ended with 1875:

To	1873.	1874.	1875.
New York.....	1,304	315	267
China.....	4,810	1,900	1,350
Mexico.....	5,038	3,761	4,104
South America.....	1,300	508	733
Australia.....	643	105	100
British Columbia.....	2	11	3
Other countries.....	103	74	311
Total.....	13,098	6,359	6,770

At 76½ each...\$1,002,075 476,468 517,905 2,215,440

The following figures show the quicksilver movement in Great Britain:

	1876.	1875.	1874.
Imports from Jan. 1 to March 31.....	1,251,688	1,104,522	979,980
Exports.....	519,411	308,892	576,180
Quantity retained.....	702,261	895,630	403,900

These English statistics, which are brought down to a very recent date, show that considerable quantities of quicksilver have moved through Great Britain, the bulk of which is received from Spain by the Rothschilds. From London, most of it finds its way back to the Continent. The average monthly distribution of quicksilver in Great Britain is usually set down at 3500 flasks, or 267,750 lbs., for home use and export. For the three months this would have amounted to 809,250 lbs., whereas it has been 1,251,688 lbs., showing that at prevailing low prices the distribution is largely on the increase in that part of the world. Last year fluctuations in prices were largely determined by momentary aspects of production. This year it seems to be exclusively a question of consumption. If China and Mexico are able to take as much this year as they did in 1875, even an increase of 10,000 flasks in the production of California is not likely to depress much, if any, the value of the metal, owing to the enormous expansion of the silver mining interest in Nevada.

The prospect of a war between the trunk lines during the summer, resulting in a gradual lowering of rates until they bear no proportion to the cost of transportation, gives many people a degree of satisfaction which would seem to indicate that they have given the subject very superficial consideration, if any. Violent fluctuations in freight rates, while they may afford temporary advantage to shippers, are by no means favorable to the prosperity of legitimate business. No man can tell what his stock of merchandise is worth unless he knows what it would cost to replace it, and in the case of goods purchased in the Eastern markets, merchants in the West and South must make a certain allowance for transportation. When this rate fluctuates, no man can tell whether, if he lay in a stock to-day, his neighbor may not lay in one to-morrow which shall cost him enough less to represent a fair profit. An element of uncertainty is thus introduced into all business between the East and the West which, added to the ordinary risks and contingencies of trade, give a speculative character to even the most prudent and judicious commercial transactions. The only ones who profit by a break in freights are those who happen to ship goods at bottom rates; but when the roads are engaged in a desperate effort to cut each other's throats, no one can tell when the bottom has been reached. Uniform rates, with only two changes in the year—in the spring and in the fall—would be vastly more favorable to the general welfare than the perpetual uncertainty which now exists as to what the companies will do next.

One of the most remarkable features in the development of engineering science during the past few years, has been the magnitude of the works undertaken and proposed. Of works already completed of this character, the Panama and Union Pacific railroads and the Hoosac Tunnel in this country, and the Suez Canal abroad, will readily occur to our readers, and of those in course of construction, the Mont Cenis Tunnel and the East River Bridge. But these dwarf in comparison with proposed works. The tunnel under the Straits of Dover will make all others pigmies. The proposal to reclaim the Sahara by letting in the waters of the Mediterranean, and to fill the Caspian Basin by means of a canal from the Black Sea, are propositions which are calculated to startle the public. The Dutch also propose to pump out the Zuider Zee, which is about the size of the State of Massachusetts. We have hardly the necessity in this country of such works, but in the proposed Darien Canal we have what may rival any of them.

New Publications.

VILLAS AND COTTAGES OR HOMES FOR ALL. By Wm. M. Woollett, Fellow of the Am. Inst. of Architects. A. J. Bicknell & Co., 47 Warren street. This work contains plans, elevations and views of twelve villas and ten cottages, and is a collection of dwellings suited to a large variety of individual wants and to various locations. The author has embodied in this work a collection of "preliminary sketches," prepared within a year in the regular routine of office work. They involve the ideas of various individuals, and are, on this account, all the more interesting. They have been designed with reference to various requirements of location and site. Some have been erected, others are in course of construction, while still others are being perfected in regard to details. In other words, these are plans, designs, etc., of actual work, just such as persons intending to build would desire to consult in order to form a model before having the working plans prepared. By

$\frac{1}{4}$ lb	$\frac{7}{8}$ by	No. 11 and No. 12.....	37
$\frac{3}{8}$ lb	$\frac{1}{2}$ by	$\frac{1}{4}$ to 3-16.....	40
$\frac{3}{8}$ lb	$\frac{1}{2}$ by	No. 11 and No. 12.....	42

The Legal Status of Furnace Scrip.

page of office letter of February 1 last, to Collector Tatem. It was held in that letter that the parties issuing these orders became liable to the taxes referred to by you.

In a paper read before the American Academy of Science, at Washington, last week, Prof. Ellis

There is now on exhibition, in this city, a

RADIOMETER

similar to that invented by Prof. Wm. Crookes, F.R.S., of London. The instrument consists

by either method it is dried for smelting or other purposes. The compounds of ammonia given off during either process may be utilized. Those of the carbonates which are insoluble in water are not so effectual or convenient in the boiling process as in the heating process.

BUSINESS ITEMS.

MASSACHUSETTS.

The Knowles Steam Pump Works, Warren, find plenty of work for their 150 men.

A display of their seamless brass and copper tubing will be made at the Centennial by the Bridgewater Iron Company. The burnished tubing shown by them is arranged in an upright case, and resembles the front of a great organ.

Work has been resumed at E. A. Morse's stove polish manufactory, at Canton.

Five car loads of their rough plate glass have lately been shipped to California by the Lenox Plate Glass Company.

Though turning out 10,000 needles a day, the Domestic Needle Works, Middleborough, intend soon to double their product.

The foundries at Springfield are turning out work for 40 per cent. less than they did at the close of the war. There is no selling below cost, as has been stated, as labor generally is also lower, though many of the old trusty molders get as much now as they used to.

Freight on the railroad is so dull that the companies have little to do with foundries, which makes the iron business doubly dull.—*Republican*.

The Chipman Mine is the only one at Newbury in which successful work is going on still, but it is claimed that it has thus far been more productive, in proportion to the number of cubic feet of ground broken, than any mine on the Comstock Lode of Nevada. The main shaft is now down 185 feet, and from a ton and a half to four tons of ore is taken out daily.

The Boston *Journal of Commerce* of the 6th says that the property of the Wood & Light Machine Company, of Worcester, was advertised for sale at auction on Tuesday morning to satisfy the claims of mortgagees, but by order of William Dickinson, one of the chief mortgagees, was deferred until June 23 to give the old firm an opportunity to secure assistance and make arrangements for settling claims against them and continuing the business themselves. The property of the company, valued at some \$251,000, is now in the hands of the assignees. The indebtedness is some \$150,000, and there are mortgages of over \$100,000 on the property. The manufactures of the corporation have gained a wide reputation, and there is a strong feeling in favor of keeping the business in Worcester. The company's sales last year amounted to \$120,000. A suggestion was made for the formation of a stock company to purchase the property, which, it was believed, could be bought for \$150,000, but the committee of the Worcester Board of Trade did not recommend such action, and the deferring of the auction sale is another expedient which is believed will be successful in retaining and continuing the business in the city.

RHODE ISLAND.

No portion of Rhode Island will be better represented at the Centennial than Pawtucket. The following houses are to make exhibits: D. Goff & Son, case of braids; James M. Carpenter, taps and dies; G. Daniels, thread; George S. Fales, thirty-inch double belt; Pawtucket Hair Cloth Co., samples of goods; R. I. Cardboard Co., samples; E. Jencks & Co., ring travelers; Fales, Jenks & Sons, water meters, riving frames, spinning frames, &c.; R. Bliss Manufacturing Company, croquet sets, tool chests, tool handles, &c.; American File Company, three cases of goods; B. P. Clapp & Co. (for United States government), chemicals; H. L. Fairbrother & Co., display of belting and leather; Conant Thread Company, cases of thread; Union Wadding Company, fifteen styles of wadding; Charles A. Luther, cloth stretcher; Payne & Mathewson, upright cone winder.

The American Screw Company, of Providence, have begun the removal of a portion of their business to Dundas, Canada, having already shipped six car loads of machinery thither.

CONNECTICUT.

Kennedy's Screw Manufactory, at Hamden, was burned on the 29th ult.; loss \$33,000.

The Northfield Knife Company will make a fine display at the Centennial. Their show case, which was forwarded some time since, contains over eight hundred pocket knives, no two of which are alike. Some of them are only three-fourths of an inch in length when open.

NEW YORK.

The Photo Engraving Company, of this city, have been compelled by the increase in their business, to remove from the premises they have occupied for four years past, at No. 63 Cortlandt street, to larger and more commodious quarters at No. 67 Park Place. With about three times the room they formerly had, and proportionally increased facilities, they will be able to turn out work more expeditiously and to much better advantage than hitherto, and will doubtless maintain and extend the reputation they have established in their comparatively new branch of art.

NEW JERSEY.

There are 16 rolling mills and 18 blast furnaces in New Jersey. Of the former 8 are running, and of the latter 11 are in blast, and 2 out of the 4 bloomeries are idle.

The mill at Oxford was built in 1866, has 25 puddling and 6 heating furnaces, 4 spike furnaces, 56 nail machines and 4 trains of rolls; one 10, one 12, and two 23 inch. The product is merchant bar, spike rods, nails, railroad spikes, fish joints, nuts and bolts. The yearly capacity is 16,000 tons, and for the last eight or nine years, it is stated, it has been turning out 15,000 tons of finished iron. The two blast furnaces turn out 17,000 tons of pig iron per year.

There are two rolling mills in Paterson. Collins' Iron Works has been idle for the last two years, and the Passaic Mill has been on double turn. This mill has the name of turning out the largest beams in this country. It

was built in 1867, and has eight double puddling and five heating furnaces; three trains of rolls and one hammer. The product is beams, channels, angles, tees and other shapes for buildings and bridges, merchant bars, rivets, nuts, etc. The annual capacity is 12,000 tons.

PENNSYLVANIA.

The Cambria Works, of Johnstown, will send to the Centennial a pyramid 33 feet at the base and 16 feet in height, with a width of 10 feet, made of specimens of fluxes, pig iron, spiegel, furnace balls, puddled blooms, twisted rails, etc., being a compendious illustration of the facilities of Pennsylvania iron works.

Since the first of December last, Wallace & Sons, at Sheridan, have manufactured and sold over 500 of their plows.

The report that the Newmarket Forge, at Anville, was to be put in operation at once is premature.

Messrs. Painter & Son have received a large contract for furnishing Leinbach's Mill, at Myerstown, with new machinery. This order will necessitate Messrs. Painter's employing a large force of workmen.

Seeing a notice of a very large pump recently put in operation at one of the Philadelphia Coal Company's collieries, a Bethlehem paper thus relieves itself: This is only a baby pump, when compared with that of the Lehigh Zinc Company, near Bethlehem, known as the "President." The President is a vertical condensing engine, 10 feet stroke, with a cylinder of cast iron, 110 inches in diameter. The total weight of the cylinder, with its head and bottom, is 40 tons. The piston rod is fastened to the cross head by a steel nut weighing 1100 pounds. There are two fly-wheels, each 35 feet in diameter, and each weighing 92 tons. The walking beam is in four parts, and weighs in all 95 tons; it gives motion to four plungers and four lift pumps, raising 17,000 gallons of water per minute from a depth of 220 feet. Sixteen boilers are connected with this engine. To be fully appreciated, this steam pump must be seen. Does Schuylkill think they have any big pumps up that way? The President is 3200 horse-power. The world is invited to come and look at this baby as they go by to the Centennial.

The large hoisting engine which has been in the course of erection at Pardee & Co.'s mines, Hazleton, is complete, and was set in motion last Friday. This is supposed to be the largest that is in use at any coal works in the State. It is 750 horse-power, 6 feet stroke, with 32 inch cylinder. The hoisting drum attached to this machine measures 16 feet 4 inches in diameter. This engine was turned out at the Lehigh Valley Railroad shops at Weatherly, and is a complete piece of workmanship.—*Hazleton Sentinel*.

Messrs. Mellert & Co., of the West Reading Foundry and Machine Shop, are running full on orders for pipe. They are filling an order for the city of Philadelphia for 7500 pieces of six-inch pipe, each 12 feet long; 100 pieces of eight-inch pipe, each 12 feet 4 inches long; 100 pieces of ten-inch pipe, each 12 feet 4 inches long, and 100 pieces of 12-inch each of the same length as the last mentioned. Mellert & Co. furnished last year all the pipe that was laid in and around the Centennial grounds, consisting of 12 and 10 inch pipe, all of which was placed in position during last fall and winter. This firm has been awarded the contract for the pipe for the city of Reading, amounting to 12,000 feet. They are also manufacturing 10,000 feet of 10 inch water pipe for the city of Wilkes Barre, which is being rapidly delivered. The new pipe mill on Grape street is kept constantly engaged upon the largest dimensions of water pipe, and this addition to Mellert & Co.'s establishment has given them double the capacity and facilities for turning out work rapidly, which they formerly possessed.

PITTSBURGH AND VICINITY.

The report that gained currency last week, to the effect that Zug's Mill would start on last Monday, was without the least foundation. There is no present intention on the part of the committee of creditors who have it in charge to start it.

The use of "hot fix" is almost a thing of the past in this section. For making certain grades of iron it is still used at Lloyd's, Brown's and Sligo.

Miller, Metcalf & Parkin are putting up a building for their new sheet mill mentioned in these columns a few weeks since. The Keystone Bridge Co. are doing the work.

Porter, Bell & Co., manufacturers of light locomotives, began working 10 hours on Monday.

Work has been begun on the second stack at the Lucy Furnace, and it will be pressed rapidly to completion. It will be the same size as No. 1, 75x20, and will for the present be used only in case No. 1 is blown out, when it will be run with the same equipment. The only new construction beside the stack will be a cast house. In lining, 30 inch brick will be used, the same that is being used in No. 2 Isabella.

Don Pedro favored the Smoky City with a call Saturday, visiting the iron and glass works.

The Lucy is now running continuously on Bessemer, having found a remedy for the building out of the furnace heretofore experienced. She is making from 90 to 96 tons per day.

No. 2 Isabella is nearly relined. It is the intention to blow both stacks, and make, on an average, 1000 tons per week.

Some trouble has been experienced with the gas the past week, water having got into the well and drowned it out.

SHENANGO VALLEY.

The Westernman Iron Co. have begun the manufacture of chains at their mill in Sharon. They already have eight fires in operation and are building ten more, and propose putting in 40 altogether. Each fire will turn out about 150 lbs. of chain a day.

The Sharon *Herald* reports concerning iron

matters in that town as follows: Keel Ridge Furnace, Kimberly, Carnes & Co., averaged 34 tons per day of No. 1 iron last week. Westernman No. 2 is working handsomely, and is making 3½ tons per day of clear gray foundry iron. No. 1 is being repaired and refitted in the most complete manner, but just when it will blow in we are not informed. Stewart Iron Co.'s Furnace No. 1 is doing handsome work, making some days as high as 40 tons, and averaging from 35 to 36 tons per day. The Ormsby Furnace, Kimberly, Carnes & Co., made, during the month of April, 1164 tons of an excellent quality of iron.

MARYLAND.

The Cumberland Furnace states that the puddling mills of the Baltimore and Ohio Railroad started up yesterday morning, and all other mills connected with the same will start up on Monday, the 8th inst.

WEST VIRGINIA.

The Clifton Iron and Nail Works were bought on the 27th ult. by W. P. Rathburn, George E. Downing and H. H. Swallow. Mr. Downing and Swallow were connected with the old company, and Mr. Rathburn is a banker at Chattanooga, Tenn., and connected with the Roane Iron Company. It is the intention of the new company to at once start up the works.

The Moundsville Rolling Mill was in operation last week.

The Belmont Furnace started up again last Thursday.

At the close of the day turn, yesterday, the boilers of the Top Mill, Wheeling, about 56 in number, notified the proprietors that they were "out on a strike." The strike was inaugurated for the purpose of getting more fine ore, as the boilers claim that with fine ore their work is made much easier. However, we understand that the Top Mill boilers get the same amount of fine ore as the boilers elsewhere. There is enough iron on hand to last the nail factory for six weeks to come, and as there is quite a large quantity of nails on hand, we opine that the boilers will find that they have made a mistake in striking just at this time.—*Intelligencer*, 6th. OHIO.

The King Iron Bridge Company, Cleveland, is one of the most extensive works of the kind in the West. Their shops, located on St. Clair street, in the eastern part of the city, cover an area of 94,000 square feet, the capacity being equal to the production of 40,000 lineal feet of work per annum, valued fully at \$15,000,000. They employ on an average 235 hands on a monthly pay roll equal to \$11,000. They have put up bridges in every state of the Union. In 1875 they manufactured and shipped 35,045 lineal feet of wrought iron bridges.—*Trade Review*.

The difficulty between the Co-operative Stove Company, Cleveland, and their molders, which grew out of a demand made by the molders for the discharge of non-union men, is about at an end. Thirty-seven non-union men are now employed in place of so many striking union men, and more are applying, but the company do not care at present to enlarge the force. They expect, however, to start up full within a few weeks, and anticipate no difficulty in getting molders. About 70 molders struck.

The *Advocate* says: The Cleveland Rolling Mill Company's new wire mill and annealing house is being vigorously pushed forward. The walls of the annealing house are almost up. This building is 75 by 125 feet, two stories high, and built of brick, with stone foundation. The rafters and beams will be iron; the roof covered with slate. The old annealing house will be connected with the new one by a covered-in bridge across Wire street. The bridge will be about 70 feet long. The wire mill's foundation walls are already laid. This, we learn, will be 115 by 48 feet, and might more properly be called an extension to the mill recently erected. The end wall of that will be torn down, thus making it over twice the size and giving it more than double its former capacity. It will also be carried three stories high in union.

The double Siemens-Martin furnaces of the Cleveland Rolling Mill Company are now running double turn, full capacity.

The Co-operative Stove Company have leased the Franklin Company's foundry, Cleveland, for three years from April 1st. This addition to their already extensive works about trebles their capacity. They are now using this foundry, their other works being temporarily idle. The Franklin Company will let out their work as required.

The Akron Steam Forge is in operation again after a few weeks' idleness.

The Eagle Iron Fence Company, Akron, are removing their works to Pittsburgh, Pa.

C. Aultman & Co., of Canton, are going to send a Buckeye mower and reaper agent to Norway.

The assignee of Diebold, Norris & Co., Canton, offered the property for sale last week without getting any bids.

The Girard Wrench Factory last week received an order for a quantity of wrenches from a hardware dealer in England.

The *Advocate* says of the wire whips that constitute a portion of the Cleveland Rolling Mill Company's Centennial display: These are drawn from a seven-eighths inch rod, and reduced in size every four inches until it reaches nine feet in length, thence it is reduced by forty-three drafts or pulls—all from the same rod—until it reaches fourteen and a half feet long. It will be seen that this wire starts with seven-eighths inch and finishes with No. 50—wire as fine as a hair on the human head.

The *Advocate*, Cleveland, says: The bosses of the old and new rod mills seem to be striving who can turn out the largest quantity of No. 4 Bessemer steel rods in a single turn. Thus far the old mill carries off the laurels. The other evening the old rod mill eclipsed all its previous efforts, and superseded the new rod mill by 235 pounds in a single turn.

The Ohio Iron Co., at Zanesville, are running

their forge double, and the finishing department single. The furnace is still in blast, and doing good work. The company have quite a stock of pig and muck iron on hand.

The Pomeroy Iron Company has been making large shipments of manufactured iron to the West. They sent about 50 tons to St. Louis in the last two weeks.

MAHONING VALLEY.

The *Indicator* says: Both of Brown, Bonnell & Co.'s rolling mills are running double turn. Their nail mill is running full time. This firm is shipping over 100 tons of iron and nails per day. Their boilers cannot keep the mills supplied, and they are gathering scrap from their yards.

The Himrod Furnaces, stacks Nos. 1 and 2, are in blast. No. 1 is running on Bessemer, and making nearly 50 tons per day. No. 2 is running on mill and foundry, and making about 30 tons per day. Stack No. 3 is not in blast, and will have to be rebuilt, at least the greater portion of it. No. 3 will not be in blast for at least two months.

The Pennsylvania Railroad Company is loading a train per day with cinder at Brown, Bonnell & Co.'s mill, and using it for ballast on their road, it being excellent for that purpose.

TENNESSEE.

The Commercial, Chattanooga, has the following relative to the prospects in that section: If the signs of the times, relating to the business in this section, are not healthy then we are not skilled in the observation of business signs. The contracts for this end of the Cincinnati Southern are about to be let; the Roane Iron Company has work enough to keep it busy with a full force all summer; the Wason Car Company are working a full force; Scofield is making arrangements to complete his mill; the English Company, at Battle Creek, are spending money freely for improvements; the river trade is lively, the streets are crowded and silver is getting common. The Roane Iron Company now have about 500 men employed here, and are running night and day. They have a contract, now about half completed, to furnish 4500 tons of rails to the Little Rock and Fort Smith Railroad. They are also doing a good deal of work for the East Tennessee, Virginia and Georgia, Memphis and Charleston, Mobile and Montgomery, Montgomery and Eufaula, Western and Georgia Central Railroads. Chattanooga will make her iron go far toward threading the globe.

KENTUCKY.

The Louisville Rolling Mill is running single turn, and will probably be in operation the entire month. The Kentucky Mill is stopped for repairs, and taking stock.

Upright Two-Cylinder Blowing Engine at Pribram, Austria.

There were in use at the Pribram Furnace up to the year 1873 two blowing engines—one driven by water-power, with a capacity of 126-3 cubic meters per minute; the other, a steam horizontal engine of 126-3 cubic meters capacity. As the former, from lack of water, was idle a greater portion of the time, and the latter was unable alone to meet the increased demand made upon it, it became necessary to erect a second steam blowing engine of sufficient capacity to blow the furnace alone.

This engine is calculated to deliver 252-6 cubic meters of air per minute, at a pressure of 65 mm. mercury. The form decided upon was that of the upright or vertical beam engine on the compound or Woolf principle. In order not to make the cylinders too large, they are made double, and two walking beams are employed. The Woolf or compound engine is of 70 horse-power, with both cylinders connected directly to the end of one of the walking beams. Power is transferred to the other walking beam and blowing cylinder through the crank shaft, on the middle of which there is the usual fly-wheel.

The steam cylinders are placed side by side as near together as possible, and in line with the walking beam. The high pressure cylinder being next the beam center, the low pressure cylinder outside, and the connecting rod to the crank shaft outside of both, the end of the beam being turned up considerably above the point at which the low pressure piston rod links are connected. The low pressure cylinder is 797 mm. in diameter and has 1580 mm. stroke. The high pressure cylinder is 474 mm. diameter, with 1132 mm. stroke. Both cylinders have jackets supplied with live steam. Radiation from these is prevented by a non-conducting coating outside of which is placed wooden lagging. Ordinary slide valves are used, which are driven by eccentrics on a shaft set at right angles to the main shaft from which it is driven by bevel gearing. A Meyer expansion regulator is used on the high pressure cylinder. It will be understood that the two walking beams are side by side a short distance from each other. The condenser occupies a place beneath the end of the second or driven beam similar to that occupied by the low pressure cylinder under the end of the first beam. Inside, or next the beam center is located the air pump which is driven from the beam. It is opposite the high pressure cylinder. The condenser is 632 mm. in diameter and the air pump 448 mm. in diameter. The vacuum maintained is 632 mm., or nearly 25 inches. The exhaust steam is led to the condenser by a U pipe, in order to get by the rim of the fly-wheel. Water is supplied to the condenser by its natural head. The blowing cylinders stand side by side, the air passages or casings around the top touching. The diameter of these cylinders is 1659 mm., the stroke 1580 mm. There are 24 felt air valves, which are backed by leather and sheet metal disks. They are fastened to thin seats by hinge disks, and are so located that there is little loss in the passages. The valves are made interchangeable, and are easily re-

newed, as a number are kept in reserve. Over both upper and lower discharge valves a casing of sheet iron is placed, which leads the air to the discharge pipe, by which it is carried to the regulator. The blowing piston is packed with linen held out by springs. The walking beams which transmit the power to the blowing cylinders are wrought iron shells filled in with cast iron centers. Each beam is mounted upon a strong cast iron column. These columns are tied together at the top and bottom by castings, that at the top being made long enough to have its ends let into the walls of the engine house. A stringer under their bases is also let into the masonry. The guides are fastened to the cylinder head and upper trusses of the engine, and are made very firm. The slides are adjustable to take up the wear. The fly-wheel is made in two parts, and weighs 9000 kilos; its diameter is 5689 mm. The steam cylinders, condenser and air pump stand upon base plates, which are bolted to the bases of the columns which carry the walking beams. The two blowing cylinders, however, rest upon an independent bed plate. The piston rods, guide rods, beam centers and pliers are of Bessemer steel, the main shaft and connecting rod of wrought iron, and the cranks of cast iron. The engine was built by the First Bochmisch-Maerischen Machine Works, Prague, at a cost of 80,300fl., or about \$16,600, currency. The total weight of the engine is 102,500 kilos. Three boilers are provided to furnish steam, one of these, however, is found to furnish an ample quantity of steam to run the engine. The old horizontal engine used 2140 kilos of coal, about 4700 lbs. for a 12 hours' run, but the new engine only requires 1720 kilos, about 3700 lbs., for the same time, and furnishes a much larger quantity of blast than the other, a strong proof of its economy.

University Honors Made Easy.

The London *Mining Journal*, in an article on "Technical Education," says:

At Paris a good memory and a careful reading of the "Manuel du Baccalauréat" will insure a fair pass, and at London passing or plucking is no criterion of the candidate's ability. It will, of course, be understood that reference is not here made to medical students, who have, perhaps, greater facilities for study in London than in any other part of the kingdom. A candidate within the writer's knowledge succeeded in passing in chemistry, although he had never seen a chemical experiment performed, and although less than 24 hours before he sat down at the examination table he gave the following sapient replies: He was asked by the writer what system of analysis he considered the best? He replied, the Geissen system, with the utmost confidence imaginable. The interrogator, surprised at the readiness of the reply, made the further inquiry: Supposing an acid solution be given you and you add hydrochloric acid thereto, what metallic precipitate, assuming a metal to be present, will be thrown down? He answered, no doubt truthfully, that it would depend upon what the solution contained. His replies to other questions upon various subjects in which he was about to be examined were equally intelligent; yet he passed, and is now a graduate, his academical success being due, not to his intelligence or perseverance, but to the fact of his having been coached by men who knew the exact caliber of the examiners, and what questions they were likely to ask.

This miscarriage of justice to students is not confined to paper universities, but extends to every institution where examination is made the sole test of competency. There are coaches who advertise that they will prepare students to pass the London Pharmaceutical Society's examination in three months, and who, moreover, are so confident of outwitting the examiners that they sometimes offer to make their payment contingent upon the pass. The fact is, that wherever the pass is dependent upon examination alone, the teaching must run in a particular groove, and the tutors or professors are prevented from employing the system of teaching which, being in accordance with their particular mental constitution, will best enable them to impart their knowledge to their pupils, and are compelled to substitute an artificial system distasteful to themselves, and ill-adapted to the honest student. The evil of the system has become so evident from the 80 years' experience in France, where, it should be mentioned, it has resulted in university degrees degenerating until the diploma of a technical school is regarded as far more honorable, that it is now being changed, so that probably ere long the old collegiate system will be revived.

New Orleans as a Manufacturing City.—The quiet way in which the manufacturing interest has been growing from projects began on a very small scale in the city of New Orleans, illustrates what can be done by commencing at the bottom and working up. It is true that from various well known causes the manufacturing industry has assumed no great proportions as yet, but the gradual augmentation of small enterprises has been such that there is now considerable importance attached to these as conducing to the wealth of the city. There are now in operation several first-class iron foundries, several sash and blinds factories, four broom factories, three manufactories of wooden ware and house furnishing goods, a number of paper box factories, one manufactory of cotton yarns, a half dozen shoe factories, a match factory, several clothing manufactories, quite a number of hat manufactories, a paper manufactory, an extensive manufacture of chemicals, two fertilizer manufactories and a large number of smaller enterprises. All of these, it may be added, were commenced by single parties and not one owes its existence to joint stock operation, nor to special protection by the government.

THE CENTENNIAL EXHIBITION.

The Opening Ceremonies.—The Attendance.—Present Appearance of the Various Departments.

Yesterday morning at 9 o'clock the Centennial Exhibition was opened to the public with simple but impressive ceremonies. The attendance was enormous. From the moment the gates were opened until far into the afternoon there was a steady inflowing stream at the gates, until a large part of the vast enclosure was black with people.

In preparation for an unfavorable morning the Centennial authorities announced that in case of severe rain the ceremonies would be held in the Main Building. The chorus and orchestra were to arrange themselves below the organ in the transept; the President of the United States would come to the circle at the intersection of the great avenue, and the invited guests would take places along the great central avenue of the nave, corresponding as nearly as possible to the assigned positions on the platform. But fortune favored, and the sun shone out bright and warm by 9 o'clock.

By 10 o'clock there were fully 50,000 people on the grounds, and at the close probably twice as many.

At 10:55 a. m. the President entered through Memorial Hall, and was conducted to a seat on the front of the platform. Governor Hartranft, General Hawley and D. J. Morrell occupied seats on his left, while Messrs. John Welsh and Goshorn were on his right. Considerable amusement was caused by the sudden appearance of Frederick Douglass, who had in some way worked his way through the crowd, and was helped over the ropes by officers and conducted to a seat on the platform. He was greeted with cheers.

At 11:03 a. m. the Wagner Centennial Inauguration March was performed by the orchestra under the direction of Theodore Thomas.

BISHOP SIMPSON'S PRAYER.

Bishop Simpson, of the Methodist Episcopal Church, was then called upon, and opened the ceremonies with an impressive prayer very appropriate to the occasion. We quote the following sublime invocation:

"May the new century be better than the past, more radiant with the light of true philosophy, warmer with the emanations of a world-wide sympathy. May capital, genius and labor be freed from all antagonism by the establishment and application of such principles of justice and equity as shall reconcile diversified interests and bind in imperishable bands all parts of society.

"We pray thy benediction, especially on the women of America, who, for the first time in the history of our race, take so conspicuous a place in a national celebration. May the light of their intelligence, purity and enterprise shed its beams afar, until in distant lands their sisters may realize the beauty and glory of Christian freedom and elevation. We beseech thee, Almighty Father that our beloved republic may be strengthened in every element of true greatness, until her mission is accomplished by presenting to the world an illustration of the happiness of a free people, with a free church, in a free state, under laws of their own enactment, and under rulers of their own selection, acknowledging supreme allegiance only to the King of kings and Lord of lords. And as Thou didst give to one of its illustrious sons first to draw experimentally the electric spark from Heaven, which has since girdled the globe in its celestial whispers of 'Glory to God in the highest, peace on earth and good will to men,' so to latest time may the mission of America, under divine inspiration, be one of affection, brotherhood and love for all our race. And may the coming centuries be filled with the glory of our Christian civilization."

THE CENTENNIAL HYMN.

At the conclusion of the prayer, Whittier's Centennial Hymn, arranged to music by John K. Payne, was sung with organ and orchestral accompaniment:

Our father's God! from out whose hand
The centuries fall like grains of sand,
We meet to-day, united, free,
And loyal to our land and Thee,
To thank Thee for the era done,
And trust Thee for the opening one.

Here where of old, by Thy design,
The fathers spoke that word of Thine
Whose echo is the glad refrain
Of rending bolt and falling chain,
To grace our festal time from all
The zones of earth our guests we call.

Be with us while the New World greets
The Old World, thronging all its streets,
Unveiling all the triumphs won
By art or toil beneath the sun;
And unto common good ordain
This rivalry of hand and brain.

Thou who hast here in concord furled
The war flags of a gathered world,
Beneath our western skies fulfill
The Orient's mission of good will,
And, freighted with Love's golden fleece,
Send back the Argonauts of peace.

For art and labor met in truce,
For beauty made the bride of use,
We thank Thee, while withal we crave
The austere virtues strong to save,
The honor proof to place or gold,
The manhood never bought or sold!

O! make Thou us through centuries long,
In peace secure, in justice strong;
Around our gift of freedom draw
The safeguards of Thy righteous law,
And, cast in some diviner mold,
Let the new cycle shame the old!

PRESENTATION OF THE BUILDINGS.

The Exhibition buildings were then presented to the United States Centennial Commission by John Welsh, president of the Centennial Board of Finance, with the following address:

"MR. PRESIDENT AND GENTLEMEN OF THE UNITED STATES CENTENNIAL COMMISSION: In the presence of the government of the United States and of the several distinguished bodies by whom we are surrounded, and in behalf of the Centennial Board of Finance, I greet you.

"In readiness at the appointed time, I have the honor to announce to you that, under your supervision and in accordance with the plans fixed and established by you, we have erected the buildings belonging to us, and have made all the arrangements devolving on us necessary for the opening of the 'International Exhibition.' We hereby now formally appropriate them for their intended occupation; and we hold ourselves ready to make all further arrangements that may be needed for carrying into full and complete effect all the require-

ments of the acts of Congress relating to the Exhibition.

"For a like purpose, we also appropriate the buildings belonging to the State of Pennsylvania and the city of Philadelphia, erected by us at their bidding, to wit: Memorial Hall, Machinery Hall and Horticultural Hall. These and other substantial offerings stand as the evidence of their patriotic co-operation. To the United States of America, through Congress, we are indebted for the aid which crowned our success.

"In addition to those to which I have just referred, there are other beautiful and convenient edifices, which have been erected, by the representatives of foreign nations, by State authority and by individuals, which are also devoted to the purposes of the Exhibition.

"Ladies and gentlemen: If in the past, we have met with disappointments, difficulties and trials, they have been overcome by a consciousness that no sacrifice can be too great which is made to honor the memories of those who brought our nation into being. This commemoration of the events of 1776 excites our present gratitude. The assemblage here to-day of so many foreign representatives uniting with us in this reverential tribute is our reward.

"We congratulate you on the occurrence of this day. Many of the nations have gathered here in peaceful competition. Each may profit by the association. This Exhibition is but a school; the more thoroughly its lessons are learned, the greater will be the gain, and, when it shall have closed, if by that study the nations engaged in it shall have learned respect for each other, then it may be hoped that veneration for him who rules on high will become universal, and the angels' song once more be heard—

"Glory to God in the highest,
And on earth peace, good will toward men."

THE CANTATA.

The following cantata, by Sidney Lanier, of Georgia, was then sung to music composed by Dudley Buck, of Connecticut. The basso solo was Myron W. Whitney of Boston.

From this hundred-terrace height
Sight more large with nobler light
Rang'd down yon towering years
Humbler smiles and lordlier tears
Shine and fall, shine and fall,
While old voices rise and call
Yonder where the to and fro
Weltering of my Long Ago
Moves about the moveless base
Far below my rest ing place.

Mayflower, Mayflower, slowly hither flying,
Trembling Westward o'er yon basking sea,
Fare thee within Farland, dear England, sighing,
Winds without But dear in vain replying,
Gray-lipp'd waves about thee shouted, crying,
No! It shall not be!

Jamestown, out of thee—
Plymouth, thee—Albany—
Winter cries, Ye freeze: away!
Fever cries, Ye burn: away!
Hunger cries, Ye starve: away!
Vengeance cries, Your graves shall stay!

Then old Shapes and Masks of Things,
Framed like Faiths or clothed like Kings—
Ghosts of Goods once fleshed and fair,
Green foul Bads in alien air—
War, and his most noisy lords,
Tongued with lithe and poisoned swords—

Error, Terror, Rage and Crime,
All in a windy night of time
Cried to me from land and sea,
No! Thou shalt not be!

Hark!
Huguenots whispering yea in the dark,
Puritans answering yea in the dark,
Yea, like an arrow shot true to his mark,
Darts through the tyrannous heart of Denial,
Patience and Labor and solemn-souled Trial,
Folled, still beginning,
Soiled, but not sinning,
Toll through the stertorous death of the Night,
Toil, when wild brother-wars near dark the Light,
Toil, and forgive, and kiss o'er, and repel.

Now Praise to God's oft-granted grace,
Now Praise to Man's undaunted face,
Despite the land, despite the sea,
I was: I am: and I shall be—
How long, Good Angel, O how long!
Sing me from Heaven a home song!

"Long as thine Art shall love true love,
Long as thy Science shall love true know,
Long as thine Eagle harns no Dove,
Long as thy Law by law shall grow,
Long as thy God is God above,
Thy brother every man below,
Long, dear Land of all my love,
Thy name shall shine, thy fame shall glow!"

O Music, from this height of time my Word unfold:
In thy large signals all men's hearts the Man's Heart behold:
Mid-heaven unroll thy chords as friendly flags unfurled,
And wave the world's best lover's welcome to the world.

PRESENTATION OF THE EXHIBITION TO THE PRESIDENT.

The Exhibition was then presented to the President of the United States by Joseph R. Hawley, President of the United States Centennial Commission, with the following words:

"MR. PRESIDENT: Five years ago the President of the United States declared it fitting that 'the completion of the first century of our national existence should be commemorated by an exhibition of the national resources of the country and their development, and of its progress in those arts which benefit mankind,' and ordered that an exhibition of American and foreign arts, products and manufactures should be held under the auspices of the government of the United States, in the city of Philadelphia, in the year 1876. To put into effect the several laws relating to the Exhibition, the United States Centennial Commission was constituted, composed of two Commissioners from each State and Territory, nominated by their respective Governors and appointed by the President. The Congress also created our auxiliary and associate corporation, the Centennial Board of Finance, whose unexpectedly heavy burdens have been nobly borne. A remarkable and prolonged disturbance of the finances and industries of the country has greatly magnified the task; but we hope for a favorable judgment of the degree of success attained. July 4, 1873, this ground was dedicated to its present use. Twenty-one months ago this Memorial Hall was begun. All the other 180 buildings within the enclosure have been erected within 13 months. All the buildings embraced in the plans of the Commission itself are finished. The demands of applicants exceeded the space, and strenuous and continuous efforts have been made to get every exhibit ready in time.

"By general consent the Exhibition is appropriately held in the City of Brotherly Love. Yonder, almost within your view, stands the venerated edifice wherein occurred the event this work is designed to commemorate, and the hall in which the first Continental Congress assembled. Within the present limits of this great park were the homes of eminent patriots of that era, where Washington and his associates received generous hospitality and able counsel. You have observed the surpassing beauty of the situation placed at our disposal. In harmony with all this fitness is the liberal support given the enterprise by the State, the city and the people individually.

"In the name of the United States, you extended a respectful and cordial invitation to the governments of other nations to be represented and to participate in this Exhibition.

You know the very acceptable terms in which they responded, from even the most distant regions. Their commissioners are here, and you will soon see with what energy and brilliancy they have entered upon this friendly competition in the arts of peace.

"It has been the fervent hope of the Commission that during this festival year the people from all States and sections, of all creeds and churches, all parties and classes, burying all resentments, would come up together to this birthplace of our liberties, to study the evidence of our resources, to measure the progress of a hundred years, and to examine to our profit the wonderful products of other lands; but especially to join hands in perfect fraternity, and promise the God of our fathers that the new century shall surpass the old in the true glories of civilization. And furthermore, that from the association here of welcome visitors, from all nations, there may result not alone to great benefits to invention, manufactures, agriculture, trade and commerce, but also stronger international friendships and more lasting peace.

"Thus reporting to you, Mr. President under the law of the government, and the usage of similar occasions, in the name of the United States Centennial Commission, I present to your view the International Exhibition of 1876."

PRESIDENT GRANT'S SPEECH.

President Grant then delivered the following address, and proclaimed the opening of the International Exhibition of 1876:

"MY COUNTRYMEN: It has been thought appropriate, upon this Centennial occasion, to bring together in Philadelphia, for popular inspection, specimens of our attainments in the industrial and fine arts, and in literature, science and philosophy, as well as in the great business of agriculture and of commerce.

"That we may the more thoroughly appreciate the excellencies and deficiencies of our achievements, and also give emphatic expression to our earnest desire to cultivate the friendship of our fellow members of this great family of nations, the enlightened agricultural, commercial and manufacturing people of the world have been invited to send their corresponding specimens of their skill to exhibit on equal terms in friendly competition with our own. To this invitation they have generously responded; for so doing we render them our hearty thanks.

"The beauty and utility of the contributions will this day be submitted to your inspection by the managers of this Exhibition. We are glad to know that a view of specimens of the skill of all nations will afford to you unalloyed pleasure, as well as yield to you a valuable practical knowledge of so many of the remarkable results of the wonderful skill existing in enlightened communities.

"One hundred years ago our country was new and but partially settled. Our necessities have compelled us to chiefly expend our means and time in felling forests, subduing prairies, building dwellings, factories, ships, docks, warehouses, roads, canal machinery, etc., etc. Most of our schools, churches, libraries and asylums have been established within a hundred years. Burdened by these great primal works of necessity, which could not be delayed, we yet have done what this Exhibition will show in the direction of rivaling older and more advanced nations in the building, dwelling, factoring, shipping, literature, philosophy and the fine arts. Whilst proud of what we have done, we regret that we have not done more. Our achievements have been great enough, however, to make it easy for our people to acknowledge superior merit wherever found.

"And now, fellow citizens, I hope a careful examination of what is about to be exhibited to you will not only inspire you with a profound respect for the skill and taste of our friends from other nations, but also satisfy you with the attainments made by our own people during the past one hundred years. I invoke your generous co-operation with the worthy Commissioners to secure a brilliant success to this International Exhibition, and to make the stay of our foreign visitors—to whom we extend a hearty welcome—both profitable and pleasant to them.

"I declare the International Exhibition now open."

The Exhibition opened at the conclusion of the President's speech (12 m.). General Hawley gave a signal, and the American flag was unfurled from the main building. Simultaneously the national salute of 100 guns was fired from a battery located on St. George's Hill, the highest elevation in Fairmount Park, and chimed were rung in different parts of the grounds. The foreign commissioners then passed from the platform into the main building and took places in the central aisle, before their respective departments, after which President Grant, accompanied by Director-General Goshorn, followed by the guests of the day, also passed into the main building, and thence to Machinery Hall, and from there to the Judge's quarters, where a reception by the President was held.

THE GREAT ENGINE RUNNING.

The procession, headed by the President, after passing through the main Exhibition building, passed to the Machinery Hall, where the President, at 1:22 p. m., put in motion the great engine, thus starting all the machinery in that building.

This closed the formal ceremonies of the day. The military then marched through the grounds, and all the buildings were opened to the public.

The following was the order of the procession as it passed through the main building:

The President of the United States, and Alfred T. Goshorn, Director General.

The Chief Justice of the United States.

The President of the Senate.

The Speaker of the House of Representatives.

Joseph R. Hawley, the President of the U. S. Centennial Commission.

John Welsh, President of the Centennial Board of Finance.

Hon. Daniel J. Morrell, Chairman Ex. Com. U. S. Centennial Commission.

STARTING THE MACHINERY.

About one o'clock the President and party moved from the main building to Machinery Hall. The crowd had been kept out of the latter building until after the procession filed in. There were probably a thousand people waiting around the Corliss engine to witness the ceremony of the starting of steam by the President. The other ten engines in the place bring the steam capacity of the engines in Machinery Hall up to about 5000 horse-power.

The first to mount the engine's platform was Governor Libbey, of Rhode Island, with his numerous staff. Then followed Governor

Bedle, of New Jersey, and staff; Governor Hartranft, of Pennsylvania, and staff, and Governor Rice, of Massachusetts, and staff; Mayor Wickham, of New York; George W. Childs, of Philadelphia; Ernestus Brooks, Postmaster Fairman, Congressman Charles M. Adams, of New York, and a number of other citizens. Soon the President arrived, escorted by Her Majesty the Empress of Brazil, followed by the Emperor Dom Pedro escorting Mrs. Grant. The crowd had grown as large and dense as possible within the immense hall, 1402 feet long and 360 feet wide, when the order "Down in front," cleared the steps to the engine, and revealed on the platform President Grant, with his hand on one wheel and the Brazilian Emperor holding the other. Mr. Corliss instructed them both how to manage them. Dom Pedro was told to start his first. This he did, and waited as if it was a mere matter of form, with no consequences. The President then turned his side, and in a second the steam began to hiss. Then came the movement of the piston, an automatic and regular climbing up and down of many tons of iron and steel. By this time the ladies had been seated, and the President and Dom Pedro stood there, hardly knowing what to do or say. The revolutions of the immense machine caused a vibration in the immediate vicinity, and the crowd cheered and became enthusiastic. The machinery in the Women's Pavilion was started by the Empress of Brazil.

THE EXHIBITION.

As soon as the procession started the vast assemblage which had gathered about the platform scattered in all directions, and filled the several buildings. From that time to the closing the grounds presented the appearance of a vast kaleidoscope, the many colored units of the surging mass constantly shifting and readjusting themselves in new combinations of infinite variety. Taken as a whole, the opening was a great success. A hasty glance through the city of buildings shows that everything beautiful and inspiring in art, useful in mechanics, valuable in science, or attractive in nature, can be seen and studied, until the eye grows tired of seeing and the mind wearied of studying. Such a scene of grandeur was certainly never before seen on this Continent, and probably in no other country was there ever gathered, in one vast collection, anything at all comparable with the Centennial Exposition of 1876. Perhaps it would be more correct to say, such as it will be when everything is complete; in the meantime much remains to be done, and it will probably be four or five weeks yet before everything is finished. The grounds are in a terribly slushy condition, some portions absolutely impassable, while the constant traffic connected with the buildings carries mud and clay in every direction, making locomotion tedious and disagreeable in the extreme.

VIENNA AND PHILADELPHIA.

The question is often asked, "How does this Exhibition compare with the others, and especially with that at Vienna?" It is difficult to answer this question, and then only in a general way. We have 56½ acres under roof, while Vienna had 38.8. Our Exhibition is nearly twice as large as that of Paris, more than twice as large as that of Hyde Park, and eleven times as large as our little World's Fair in New York which President Pierce and his Cabinet opened with so much state nearly a quarter of a century ago. These figures are deceptive, because many buildings within these grounds are not essential to the Exhibition. If the money spent in State buildings had been devoted to the collection of the mineral, agricultural or industrial resources of each State in some of the main halls, it would have been more useful. There were none of these at Vienna, and beyond affording a loading place for the free minded American citizen to discuss the Presidential canvass during the warm summer afternoons, they have no great value. Vienna was remarkable for the variety of outside buildings which had a true interest in a world's fair. There were cottages for showing how the peasants in Hungary and Styria lived. There was a Russian house, famous for its architecture and its beer, and its caviar lunches. There was the Khedive's palace, built before people knew he was a bankrupt, a beautiful building, showing an exact idea of Oriental life, from the farm yard to the harem. There was the exquisite Moorish house, with its open court, almost a doll house—it was so small. There was our American school-house which all self-respecting Americans used to go out of their way to avoid; and a Swedish school house, which was a gem. There was the pavilion of the Prince of Monaco, as pretty as a boudoir, and exhibits like those of Prince Schwartzburg, which were worth going to Vienna to see. With a few exceptions there was scarcely a building outside of the main halls in Vienna which did not have a positive meaning as a part of the World's Fair. Where our Exhibition surpasses Vienna is in its compactness. It was a day's journey from America, at one end, to China, at the other, and when you had taken that trip there was still another to the Art Gallery beyond. We have a Horticultural Hall, which surpasses Vienna, where flowers were shown in the open air. We miss Greece, whose poverty leaves her out of this company of nations. As a recompense for the Khedive's palace we have the English buildings, which are among the gems of the show. In Vienna there was a plain cottage and a few frame buildings for workmen. In our grounds we have dwellings copying faithfully the architecture of the sixteenth century—the tile roofs, the quaint red brick chimneys, the rooms in paneled dados—a complete picture of the home of an English gentleman 300 years ago. There was nothing of this at Vienna, and I shall never cease to mourn the apathy of Philadelphia if her authorities do not purchase this superb exhibit, and retain it as a permanent

attraction of the Park. The Japanese house is novel and curious, and, although Japan did well in Vienna, her display was nothing to what it is with us.

THE PRESENT STATE OF THE EXHIBITION.

Notwithstanding the vigorous efforts of the Commissioners to insure promptness on the part of exhibitors in forwarding their goods, the Exhibition is as yet very incomplete. In this matter many exhibitors are much to blame.

As far as the comparative state of readiness is concerned, the principal buildings of the Exhibition will by no means stand on the same footing. The most advanced toward completion will undoubtedly be the United States Government Building. Then will rank Machinery Hall, Horticultural Hall and Agricultural Hall. The main building and the two art galleries, which will undoubtedly be the most interesting to the mass of the public, will unhappily be the last to receive the finishing touch which the visitors will wait so impatiently.

But while the Exhibition yet lacks much of completeness, owing to the tardiness of Americans and foreigners in beginning the work of preparation, it already presents many striking and gratifying features which cannot fail to attract public notice.

One of the most striking among these features is, for instance, this: That England, notwithstanding the large display she makes of the products of both the mother country and the colonies, exhibits, with but few exceptions, nothing that is not to be found of just as good quality and workmanship in the American department. Her Indian carpets, shawls and other tissues are, of course, quite exceptional products, and they are Indian, not English. But, in the usual lines of manufacturing and industrial activity there is, as far as can be seen now, very little in the British, the Canadian, or the Australian departments which surpass the French, the American, or the Belgian exhibits, while every one of these has something to show surpassing either in finish, design, or nature of material, similar English products. Happily for England, her department is placed opposite those of Spain, Turkey, Egypt and other outlandish countries. It is only on its flanks that the English department comes in contact with true rivals, and the contest on these flanks will not always prove a victory to the country which stood once at the head of the industrial and manufacturing world. Notwithstanding the belief that prevailed some time ago that the jealousy which the English nourished toward America would prevent them from making a big display at Philadelphia, they have sent all that could possibly be expected. In fact, it would be difficult to say whether it will be France or England which will make the larger display, though there can be no doubt that from the very day when the idea of the Centennial Exhibition was originated the French showed themselves more enthusiastic about it than any other country.

Another curious point which strikes the visitor at the very outset is the comparatively small part which Germany plays at this Exhibition. The strength of the German element in this country would have led one to suppose that its commercial and mercantile interests must be incomparably larger than is implied in the limited space occupied by Germany and the restricted range of products exhibited. Some porcelain and glass ware, some few textile fabrics, and a fair number of works of art, are all that we have seen in the flying visits as yet paid to the buildings. On the other hand, it is pleasant to contemplate how considerable an interest seems to be taken in the Exhibition by minor countries like Belgium, Holland, Sweden and Norway. The departments of these four countries will undoubtedly be among the most interesting, and, keeping in view the kind of notion which prevails in the United States that these countries are little bits of land not worth while taking notice of, the richness of their displays must prove highly instructive, too. That China, Japan, Brazil and South American countries in general have exerted their efforts to show themselves to the best advantage in Philadelphia is natural enough. Their constant commercial intercourse commands it, but the fact that minor European States, which have no large commercial fleets, and which until now were supposed to send only half starved emigrants to this country—that such countries make the grand, varied and remarkably fine display they do make, is the best proof of both their industrial progress and their desire to come into closer relations with the American nation. And this is one of the main aims of an exhibition of this nature.

THE MAIN EXHIBITION BUILDING.

This vast structure, probably the largest building in the world, covers 21½ acres of ground, and is in the form of a parallelogram, 1876 feet long by 464 wide. In the center are four square towers 130 feet high. The facades at the ends are 90 feet high and the corner towers 75 feet. The central aisle is 1832 feet long, 120 feet wide, and 70 feet from floor to roof. The framework is of iron, filled in with wood and glass. There was no building at previous world's fairs as large as this, and none that equaled it for general exhibition purposes. At the east entrance is the principal approach for carriages, and at the south entrance for visitors arriving by street railway. The west entrance leads to Machinery Hall, and the north entrance to the Art Halls. In the Main Building is the general display of manufactures, and all the nations taking part in the Exhibition are represented here. With few exceptions, the space occupied by each country has a frontage on the central aisle, and in this conspicuous position each naturally seeks to show the chief treasures of its collection. Some countries inclose their areas with architectural structures of picturesque design, others wall in a court to which access is gained under an emblematic archway.

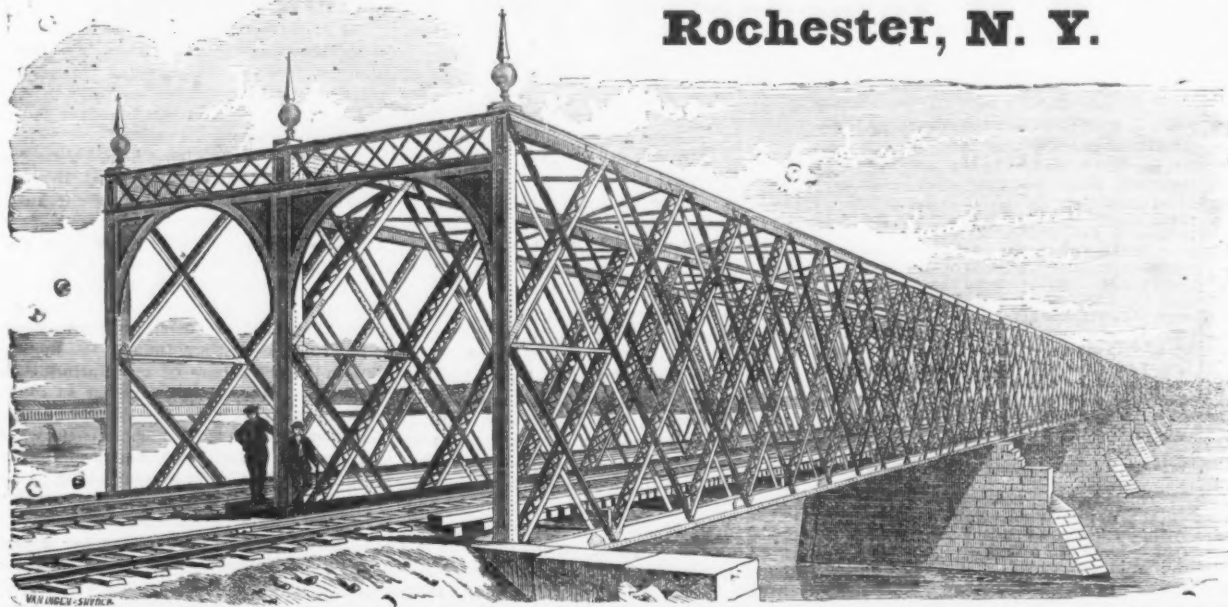
(Continued on Page 20.)



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 Upholstery, Gimp, Brush, Card, Pall and Cheese Box Tacks; Leathered, Tinned and Iron Carpet Tacks; Bright and Blued Finishing Nails; Cigar Box and Chair Nails; Trunk and Clout Nails; Brads, Patent Brads, Copper Tacks and Nails; Iron, Zinc, Steel and Copper Shoe Nails; Polished 2d and 3d Fine Nails; Roofing and Siding Nails; Roofing Tacks, Tinned Tacks and Nails of every variety. Also, Bright and Japanned Lining and Saddle Nails, Tufting Buttons and Nails of any color. Any size or style of Tack or Nail made to sample. Orders sent to either Factory or Salesroom will receive prompt attention.

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Wrought Iron Riveted

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Wrought Iron

WATER PIPE,

The most economical and durable Pipe man-

ufactured for Water Works, Oil Lines or Gas Mains.

General Riveted Work

Orders solicited from Civil Engineers

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[Accompanying engraving represents the Spring-

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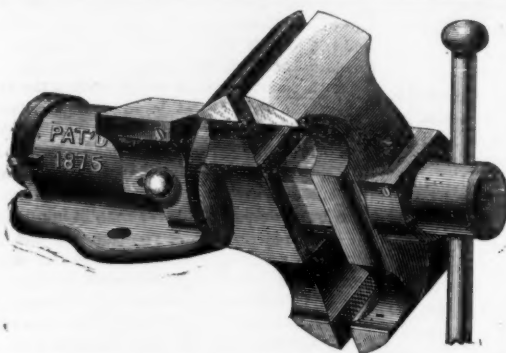
Bridge and Iron Works.]

SPRING PERCH CO., Bridgeport, Conn.

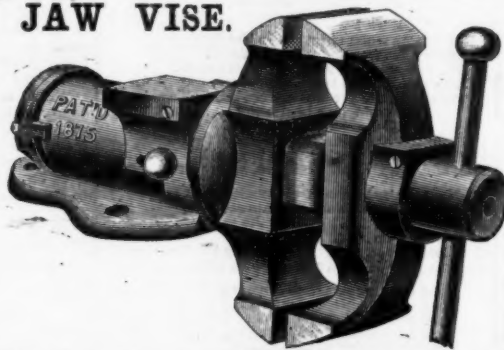
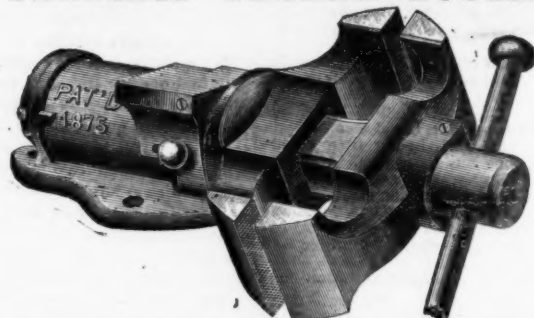
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SPRINGS & AXLES

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We call your attention to a new form of Patent Vise, possessing double jaws, which may be so adjusted as to hold an object at any desired angle with great firmness. This arrangement offers great advantages over any other Vise, as the operator can place his work at any angle suited to his convenience. On the standard there is a spring bolt, which, when it is desired to adjust the jaws, is drawn back, and the jaws are set at any desired position. The face of one pair of jaws are roughened, and those of the other pair are smooth, to suit different kinds of work. The whole construction of the Vise is such as to prevent any chips or filings entering the working parts. Into the end of the standard is placed the flange nut, into which passes the Vise screw, which is on a direct line with the flange nut, which is held in its position at the rear end of the standard by two steel screws holding it firmly in its place. Send for Circular and Price List. Manufactured by ELMORE PENFIELD Middletown, Conn.

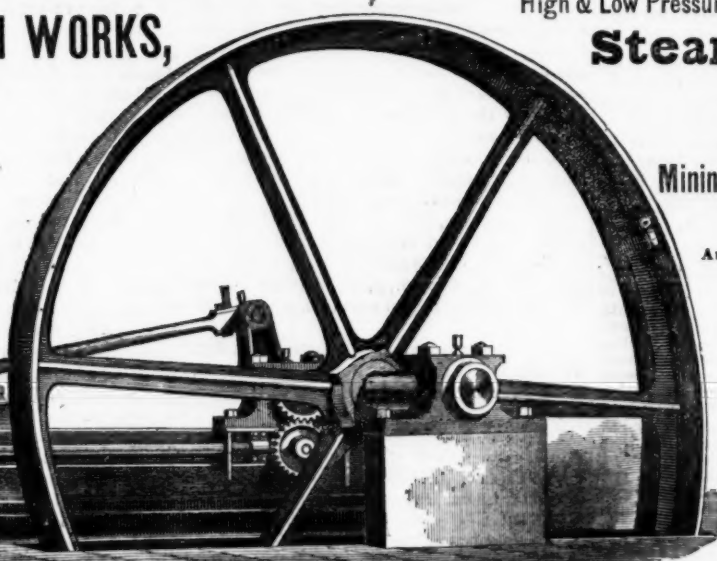
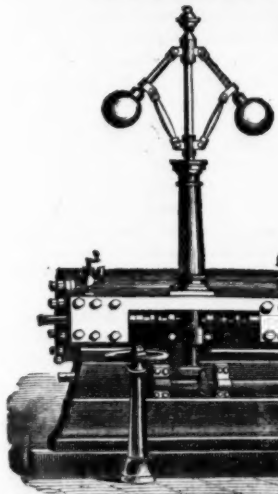
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High & Low Pressure Marine & Stationary

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position Castings made

to order.

The following are a portion of the Engines manufactured at these works and are a sufficient guarantee of our capacity for doing first-class work, viz.: The Pumping Engines in the cities of Brooklyn, N. Y.; St. Louis, Mo. and Hartford, Conn., and in the Charlestown, Mass. and Norfolk, Va. Navy Yards, and the engines in the U. S. Steam Sloop of War Michigan, Kearsage, Manitou, Minnetonka and Piscaqua and the Gun Boat Cayuga, Pequot and Nipsic, the Government Transports Dudley Buck and Geo. C. Collins, and the Steamships America and United States. Also the large Horizontal Engine for the new Plate Mill of the Bay State Iron Co.

ERIE Lawn Mower.

The gearing is so perfectly inclosed, that it needs no cleaning. The revolving cutter is so constructed that it is impossible for grass to wind around the shaft. Has adjustable cut.



Inside Gearing.

The most perfect Lawn Mower in the market. Has so few parts that nothing can get out of Repair.

Is so simple in construction that any one can understand it.

Works so easily that a child can run it. Does the work so perfectly that all admire it.

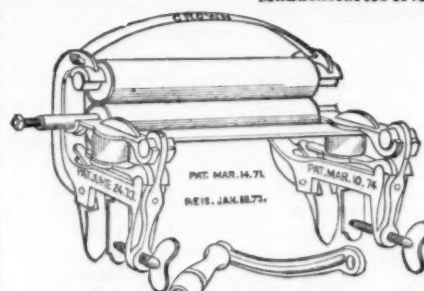
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The American Machine Co.,

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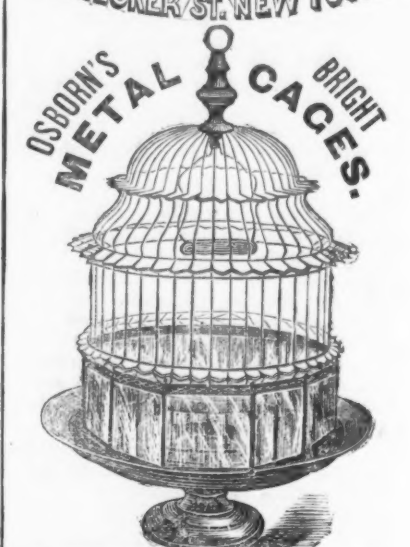


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The Original Inventors and Manufacturers of the

OSBORN BRIGHT METAL CAGES.

Also OSBORN & DRAYTON improvements under twelve different patents. We are continually bringing out new and beautiful designs to meet the demands of refinement and taste.

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Patented,
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Bright Metal
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Nos. 247 & 249 Pearl Street
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PYROMETERS

for BLAST FURNACES.

E. BROWN'S STANDARD PORTABLE,

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Over 300 "Gauntlet" and 100
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use at Blast Furnaces.

E. Brown's Portable Blast Gauge
for the plug hole, Steam Gauges,

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ALSO,
REVOLUTION

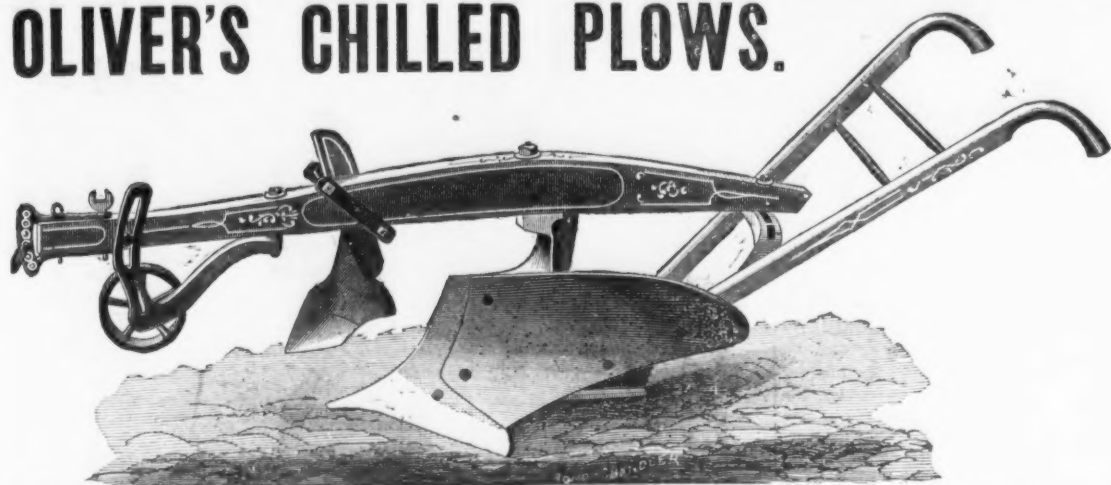
INDICATORS.

The Revolution Indicator is driven like a governor, either from a horizontal or vertical shaft; it constantly indicates, without the use of a watch, the number of turns per minute made by a Steam Engine.

There are many engines which have to run at varying speeds for different operations, also engines controlled entirely by hand. For such, the Revolution Indicator will be found particularly useful.

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OLIVER'S CHILLED PLOWS.



These implements, though but four years before the public in their present form, show the following remarkable record:
 1506 were sold in the season of 1871. 7472 were sold in the season of 1873. 31,077 were sold in the season of 1875.
 3049 1872. 14,976 1874.
 The sales for 1876, will undoubtedly exceed 60,000 Plows, one-third of that quantity being now on our order book. For full descriptive circulars, address

SOUTH BEND IRON WORKS, South Bend, Ind.

SOMETHING NEW!

SAMSON WRENCH.



It is the only Wrench that will hold Gas or Steam Pipe, Gas Burners, Round Iron or Steel without slipping. Samples sent to the trade only, on receipt of fifty cents and business card.

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 Electro Plated Ware, German Silver and Britannia Spoons.



Factories, Wallingford, Conn.

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IMPROVED DERINGER REVOLVERS.

No. 1, 22 Calibre; No. 2, 32 Calibre, Long Cartridge.



Cut Represents No. 2, 32 Calibre, 5 Shot. Size reduced one-third.
 Exact Model of S. & W. No. 1 and No. 1-2 Revolvers.
 These Arms are Half Nickel Plated and are equal in style of finish to the best Arms in the country. Quality of workmanship and material first-class; warranted. Price less than any other Hinge Barrel Cartridge Revolver of same quality in the market.

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THE VICTOR PLANES

Are the most simple, compact and practical Adjustable Planes ever offered to the public. They are made under the personal supervision of Mr. L. BAILEY, the original inventor of L. BAILEY'S PATENT ADJUSTABLE IRON PLANES. All our Planes have our Trade Mark. Send for Catalogue, embracing Planes, Try Squares, Bevels, Rules, Levels, Hammers, Mitre Boxes, etc., etc.

LEONARD BAILEY & CO.
 MANUFACTURERS OF MECHANICAL TOOLS.
 PATENT ADJUSTABLE PLANES.
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CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other.
 Two sizes: Large Size Boring, $\frac{3}{4}$ to 3 inches; Small Size Boring, $\frac{1}{4}$ to $1\frac{1}{4}$ inches.



WILLIAM A. CLARK, - - - Westville, Conn.

Improved Apple Parers.

We present herewith illustrations of apple paring machines manufactured by D. H. Whittemore, which possess some important improvements over his patterns of last year.

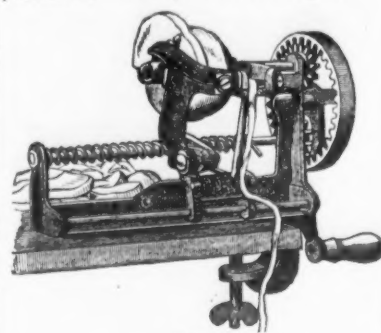


Fig. 1.

Figure 1 shows the "Bay State" Paring, Coring and Slicing Machine, improved so that the apple is cut and thrown from the fork in slices while the paring is being done, leaving only the core to be removed.



Fig. 2.

Figure 2 shows the Skeleton Apple Paring, Coring and Slicing Machine, with a similar slicing arrangement as the "Bay State," completely finishing the apple.

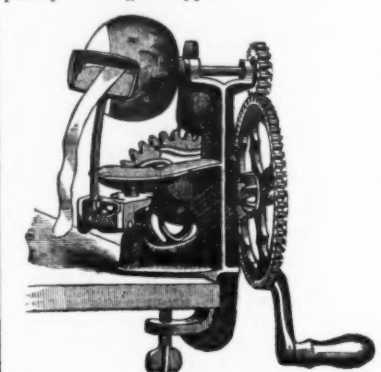


Fig. 3.

Figure 3 shows the Union Apple Parer, improved by the use of a larger driving wheel and a small gear instead of cams, requiring only two turns of the crank to an apple. It is strong, and has a "push-off" attachment. J. Clarke Wilson & Co., No. 81 Beekman street, are sole agents for these goods, the prices for which will be found in our trade report, under the head of "General Hardware."

Improved Casting Arrangements for the Siemens-Martin Process.

Mr. Michael Scott, of London, proposes an improvement in the arrangements for casting steel melted by the Siemens-Martin process, which may be briefly described as follows:

Upon a base plate mounted upon wheels, which run upon rails laid in the bottom of the casting pit, a number of molds are ranged round a central git. Each mold communicates near its bottom with a git, by means of a runner pipe of fire brick. The central git is a tube of fire brick, in some instances cased in iron, probably boiler plate, bent to fit the brick tube, both tube and iron casing being divided longitudinally into two or more parts, the joints in the brick tube being opposite the solid part of the casing, and *vice versa*. The git is tapered both inside and outside, being larger in diameter at the lower end, and the parts of which it is formed are secured together by elastic hoops forced from above along the tapered exterior. These hoops are rings of iron or steel, made to the shape of the outside of the git, with portions of their periphery bent into loops that can yield or spring a little. When prepared for use, the git is provided at the top with a feeding head, having a side spout situated a little above the level of the tops of the surrounding molds, and this spout is directed over a spare mold, which does not communicate with the bottom of the git. The object of this arrangement is that as a surplus of metal must always be provided, in order to insure the complete filling of the molds, the spare mold would be a receptacle for the residuary metal.

The platform supporting the molds and git being run up near to the melting furnace, sufficient space, however, being left for a slag box, a spout lined with fire brick, or other suitable material is so placed as to extend from the top hole of the furnace to the feed head of the git. On first tapping the furnace, a metal plate is held in an inclined position over the upper end of the spout, so as to direct the first material from the tapping hole down into the slag box, but as soon as the metal begins to run, this plate is withdrawn, and the metal then flows along the spout to the enlarged head at the lower extremity, where such cinder as may be carried with the metal floats upon the surface. The stopper in the enlarged head of the spout being then raised, the metal flows down the git, charging the molds to the top, after which the surplus metal flows into the spare mold. As soon as the flow of metal from the furnaces ceases, the end of the spout is shifted aside,

and the slag runs down into the slag box. It will be seen that from the time the metal begins to run into the molds, there is no machinery to be moved, in fact nothing to be done, and, therefore, but little risk of a hitch occurring during the operation of casting. The spout having been removed, the platform bearing the charged mold is wheeled away from the furnace, and the furnace men relieved from the heat. The molds are then taken off the ingots, the runner pipes broken, the runners cut, and the ingots removed. The central git is taken to pieces, the base is divided into three parts, the lower half being in one piece, and the upper half consisting of two pieces. By this arrangement, when the upper pieces are removed, the steel filling the git and runners can be lifted up and carried away.

The casings surrounding the base of the git and runner pipes are of sheet iron bolted to the base plate. When filled with sand, all joints are enveloped and secured so as to prevent the escape of metal even should the pipes be fractured. When casting very tall ingots, the sand may be rammed and the covers put on. The central git being formed of refractory material, it would not be cut up by the hot metal, even if a large quantity passed through it, as would certainly be the case if an iron git were used. It will be observed that there is a fire brick lump proposed for the bottom of the molds, which, when using molds closed at the top, would afford the double advantage of regulating the length and consequently the weight of the ingot, and of protecting the lower edges of the mold which are frequently attacked by the hot metal. This power of regulating the length of the ingots when using close topped molds, is one of some importance, for any weight of ingot beyond what is required becomes scrap, and with a variety of weights required, either this must be submitted to, or a large stock of molds kept. When using split molds, it is intended that the parts should be secured together by elastic hoops. The metal setting in the central git would form an ingot of useful dimensions, and the horizontal runners would be of such size as to be available for many purposes. These runners being cast under considerable head or pressure ought to be sound, and they would be clean castings. The slag box under the tapping hole of the furnace is arranged so as to be lifted by a crane and placed upon a truck, to which it is attachable by hinged joints at one of its lower corners, and a barrel worked by a winch is provided at the other side of the truck, with chains attached to the angle of the box below the barrel. When the truck has been wheeled to the side for tipping, the chain is wound on the barrel, and the box is thereby canted on its hinged joints, until the center of gravity passes beyond them, whereupon the box tips over and delivers its contents. By again turning the barrel, the box is drawn back and lowered into its normal position on the truck.

The proposed apparatus requires no alteration in ordinary casting pits—ladies would be abolished—the debris arising when clearing the tapping port, and any cinder which appeared at first would not go into the spout, whilst provision is made for instantly changing the direction of flow from the furnace, when all the metal is out, and directing the mass of the slag into a suitable receptacle, while the construction and working of the whole is simple and inexpensive. These points are not unimportant, for if the run of the metal requires to be stopped, as in the event of changing from the filling of the one mold or group of molds to another, then, although not so large, a ladle is still required to contain the metal flowing continuously from the furnace, whereas in the author's plan there would be no interruption to continuous flow into the molds. No doubt the dimensions of the ladle could be diminished by reducing the flow from the furnace, but according to the author's ideas, this is the very thing to be avoided, for the more rapidly the furnace is emptied the better.

Preparing for the Final Blast at Hell Gate.—The work of excavation at Hell Gate, preparatory to the final blast, has been finished several weeks, and the only work going on there at present is the pumping out of the water which filters into the mine from above, and the building of a piece of sea-wall to protect the shore from the action of the current which will sweep against it as soon as the reef is removed. This wall, which will be 150 feet long, 8 feet thick, and 12 feet high, is flanked at each end by a heap of debris, making an efficient protection to the soft earth of the shore. The testing of the various explosives used in submarine blasting has been going on for some time, and a dozen different preparations of nitro-glycerine were exploded on Friday last with a view of testing their efficiency for this work. The gun-cotton prepared at Stonemarket, near London, has thus far given the most satisfactory results, and will probably be the explosive adopted. This material has not been much used in our government work, and no manufacture of it exists in this country. It will be placed in holes drilled in the piers and in the roof, those in the latter being placed five feet apart and extending half way through its thickness. About thirty tons of gun cotton will be required, which will be placed in position at the last moment, that it may be exposed as little as possible to the action of the water. The present appropriation will cover the expense of the final blast, and before that takes place it is hoped that a sufficient appropriation will be made to secure the removal of the debris.

A French writer says civilization seems to be reduced down to the fine point of building iron clad vessels capable of resisting the heaviest projectiles, and subsequently turning out guns sufficiently powerful to drill daylight through their hulks.

(Continued from Page 17.)

and others place their most attractive show cases along the line of the aisle.

We give below a brief description of the exhibits of the principal countries occupying space in the Main Building:

THE UNITED STATES.

Nearly one-third of the entire space is occupied by our own people, whose exhibits cover about seven acres, and are mostly contained in show cases of great variety. In the very thing in which foreigners were supposed to have more taste, as they were known to have more experience—the devising of handsome accessories to enhance the attractiveness of exhibits—our countrymen lead all rivals. Wandering through the long avenues, lined by cases of strikingly novel designs and elaborate workmanship, one may be wearied by the endless variety, and may find the simple uniformity of the French section a relief; but he cannot fail to be impressed by the fertility of resources, the original genius for decorative effects, and the evident liberality of expenditure displayed; and he will remark a certain unstudied harmony in dissimilarity produced by the mingling of diverse colors and forms, and may find in it a faithful reflex of our composite American life. The American display is in no respect a disappointment.

GREAT BRITAIN AND HER COLONIES.

The section occupied by British exhibits is not inclosed by a pavilion, and there is a conspicuous absence of decoration—the idea being that too much elegance in the surroundings would detract from the interest of the articles exhibited. The cases are very plain, and are stained black. The main features of the British exhibit are pottery, silver-plate, galvanoplastic reproductions of medieval art works and tiles. Cutlery from Sheffield and other cities stands prominent—here and there being seen crowns, sun-bursts and other emblematic figures formed from knives, forks and spoons.

Canada occupies almost as much space as the mother country—Quebec, Ontario, Manitoba, Nova Scotia, New Brunswick and British Columbia being represented. The geological department is made a leading feature of the exhibition. The ores and petroleum are noticeable. The Commissioners point out a lump of plumbago 6 feet by 4, said to be the largest ever mined. Fine specimens of red granite from New Brunswick also attract attention. The ship-building industry is represented by an interesting display of models from leading ship yards on the sea coast. Specimens of stone-ware, which are claimed to equal the celebrated Staffordshire ware, are shown. Marble mantel-pieces, made in Montreal, are claimed by the exhibitors to equal in delicacy of finish and beauty of design the Italian. The boot and shoe interests, drugs and chemicals, sewing machines, circular and other saws, pianos, and segars have also fine samples in the collection. The extent and variety of Canadian industries, as represented here, will surprise English and American visitors. Victoria shows models and the products of her gold mines, and some fine copper work; South Australia shows principally the products of the soil; New Zealand is chiefly represented in pictorial delineations of her natural scenery and people; The Cape of Good Hope sends various choice natural products; India is principally represented by articles taken from the India Museum, London, and the other colonies by natural products. None of them occupy much space or will be centers of attraction.

France is much behind the other nations in getting her department ready, and it will scarcely be presentable under a fortnight. The place of honor in the crescent fronting the open space, where nave and transept of the building cross, is occupied by a mantel piece 15 feet high, in black marble, ornamented with statues and high reliefs in gilt and verd antique bronze. The maker is L. Marchand, and the work is a *chef d'œuvre* of its class, unequalled in the exhibition. Largest and most attractive of all the groups is that of porcelain. There are four exhibitors of porcelain proper, and six of faience and majolica; among the latter is Barbizet, whose reproductions of Palissy ware are famous; Biot, Jules Henry, Hache & Pepin and Haviland. One establishment shows only work in imitation of old faience. The entire porcelain display faces that of the English, from which it is separated only by a broad walk. Comparisons between the art of the two countries will eventually arise, and the verdict of critics, as in most matters of taste, will not always agree. Silks and velvets occupy a large space. The exhibit is a collective one in tall cases enclosing a court, with cushioned seats in the center. The display of that large class of objects known on the Continent as *Articles de Paris*, is of course extensive. This class of ware includes jewelry, bronzes, clocks, mantle ornaments of all styles and materials, fans, ivory crosses and small art works of all kinds. As a whole this exhibit will possess great interest for all classes of visitors.

GERMANY.

The feature of the German Exhibition is the pottery from the Royal Prussian factories. This is of great beauty and variety, and shows a high artistic standard among the German decorative painters. The literature of Germany is well represented by a splendid display of books; her manufactures by the choicest products of workshop and factory.

A very striking exhibit is made by a Hamburg ivory manufacturer of a case of elephants' tusks and ebony. Of toys the show is large, as was to be expected, for Germany supplies the entire civilized world with children's playthings. Leather goods are well represented. The group of chemical products is exceedingly full. Two firms of lead pencil makers vie with each other in the size and elegance of their displays. The

Bavarian makers of metallic foils and bronzes make a noticeable display. In the way of general domestic manufactures the articles are too numerous to specify without falling into a catalogue style. The chief impression produced by the German section is, that while the idea of beauty is not lost sight of, it is subordinated to that of use. Durability is sought rather than ornament, and although many articles possess considerable beauty, there is a certain heaviness that characterizes them all. This quality is undoubtedly an outgrowth of German national taste, and expresses the Teutonic idea of beauty far better than does the elegant lightness of French ornament.

THE NETHERLANDS.

Externally, the Dutch section is very ornamental, and the manufactures exhibited show that the arts have attained a high degree of perfection in that country. The display is chiefly characterized by variety, and will attract much attention.

BELGIUM.

Belgium presents an extensive variety of excellent products. The group of iron and steel is not as large as might have been expected, but it is extremely interesting. It includes bar iron, rails, steel ingots, bridge girders, car wheels and nail rods. The exhibit of arms is very fine, and all the industries of this busy and enterprising little kingdom are very creditably represented.

NORWAY AND SWEDEN.

The departments occupied by the two divisions of the Scandinavian Peninsula are well filled and very interesting. Norway's exhibit is rather miscellaneous in character, but will be found curious and well worthy of study. Sweden makes a fine exhibit of Bessemer steel. The largest contribution of this kind is that of the Sandvik & Fagaster Works. Here are to be seen specimens varying in character from a piston rod 15 feet long, for a steam hammer of five tons, to a finely polished hand mirror for a lady's boudoir. Locomotive tires are shown which are said to have run 187,759 English miles without having been "turned." There is an almost endless variety of steel files, saws and other tools of the finest workmanship. There is a large display of the finer articles of iron and steel manufacture, such as scissors, knives, skates, swords, etc. Among other articles is an odd case filled with safety matches from Johnkoping. Match making is a great industry in Sweden. The extent to which the art of wood-carving is developed is shown by a triumphal arch fifteen or twenty feet high contributed by a nobleman, H. H. V. Essen. This arch is the work of the peasantry on his large estate. This display of porcelain is exceedingly fine. Floral decorations are much used, and for ground-work tints of extreme delicacy and beauty are employed. A tall chimney piece of an opalescent blue is elegant. A large map of the geological survey of the kingdom and a topographical map are excellent in their way. A very attractive feature is Parian marble models of fountains in the various squares of Stockholm, from the two factories of Rostrand and Gustafsberg. Across the main avenue and separate from the exhibits mentioned is a military display, consisting of small arms, cartridges, shot and shell, a gun and caisson, and various accoutrements.

AUSTRIA AND HUNGARY.

In the character of their exhibits the Austrian Empire differs but little from Germany. The department is well filled and presents a pleasing variety of articles, few of which will have special interest for our readers.

ITALY.

Italy exhibits works of art almost exclusively. The display in of wonderful beauty and value, and is rich in treasures of painting, metal work and pottery.

SWITZERLAND.

Switzerland makes a specialty of watch makers' tools, watches and wood carvings. This department appears to be one of the best and most systematically arranged in the building, and does great credit to the Swiss Commission.

SPAIN.

Spain has provided an inclosure of striking beauty, filled with a great variety of useful and beautiful products. The character of the Spanish people could not be judged from the display they make; or if it were, they would be accredited with an industry and enterprise far greater than they are commonly supposed to possess.

CHINA AND JAPAN.

The Chinese and Japanese departments in the Main Building are very curious and interesting. The Chinese exhibits are quaint, grotesque and ingenious; those of Japan seem to show a higher and more practical civilization. Many of the Japanese manufactures possess great utility, and should be more largely represented in the world's trade. Judging from the exhibits of the two countries, it would be reasonable to conclude that Japan is a much more valuable and promising neighbor than China, with a much higher capacity for useful production.

Of the displays of the other foreign countries occupying space, we have neither the time nor the space to speak. The crowd and confusion on the day of opening rendered a careful examination impossible, and but few of those not specifically mentioned have anything to show which can properly claim critical notice in the columns of *The Iron Age*. Such as do will receive careful attention during the progress of the Exhibition.

MACHINERY HALL.

Outside of the Main Exhibition Building the chief interest for our readers will be found to center in Machinery Hall. This building, which is especially devoted to machinery in motion, has a length of 1402 feet and a width of 360 feet. It contains machines for working in metal, wood, glass, clay, stone, fiber, paper and gum; and also prime movers, such as steam, air and gas engines. In a separate

building are machines for working in leather, and still other buildings have certain special machines and processes. On the south side of the parallelogram forming the main body of Machinery Hall, is the hydraulic annex, 205x210 feet, with a tank 60x106 feet, around which the pumps are grouped, each discharging overhead into the tank at an equal height above the surface of the water. At the south end of this annex is a tank raised 33 feet from the floor of the hall, and pouring a cascade of water of 36 feet in breadth, the sheet of water having a weir depth of about four inches. The water is raised by two rotary pumps, each driven by an engine of 150 horse-power, and amounts to 30,000 gallons per minute.

Eight main lines of shafting are provided for the machinery in the avenues and aisles, the larger portion being speeded to 120 revolutions per minute, and one line to 240 revolutions, principally for the wood-working machines, which occupy the larger part of the west end of the southern aisle. With the subsidiary lines, the length of shafting is estimated at 10,400 feet, each main line of 650 feet transmitting 180 horse-power to the various machines connected with it.

It is obviously impossible for us to attempt any description of the contents of this great structure, especially as some of its most noteworthy features have already been mentioned in these columns. As a whole, the department is not ready for critical examination. Many of the spaces are still empty, and in others the work yet to be done is considerable. In due time we will present full and accurate reports of all its more interesting features.

Of the other buildings, whose position is given on the excellent map of the grounds published on our first page, we must reserve mention. Few of them claim our special attention, but such as do will receive it.

As the buildings were only thrown open to the public on the afternoon of the day *The Iron Age* is put to press, we have had barely time for a hasty glance at some of the multitudinous exhibits of metals, hardware and machinery, and can only refer in the briefest way to a few, beside which there are a great many of equal and perhaps superior interest. Of course the great Corliss engine is one of the most striking objects to be seen in the whole Exhibition, as is the huge sugar mill shown by a Glasgow house. Fine displays of machinery are also made by Thos. Wood, William Sellers, Thorne, DeHaven & Co., Ferris & Miles, Hoopes & Townsend, Allison & Sons. The display of tools by Henry Diston & Sons is of great extent, artistic in design, consisting chiefly of saws, for which they are so widely known, both in this and other countries. They have two cases, 48x30 feet, with counters in front, displaying, in addition to saws, planes, squares, chisels and other tools. Upon these two cases rests an immense arch, formed of 100 saws, representing the age of the nation. The Keystone of this arch is formed of 13 circular saws, bearing the names of the 13 original States. They also exhibit a circular saw 76 inches in diameter with 56 teeth, corresponding with the number of the signers of the Declaration of Independence, also another 100 inches in diameter, and a California Mulay saw, 16 feet long by 16 inches.

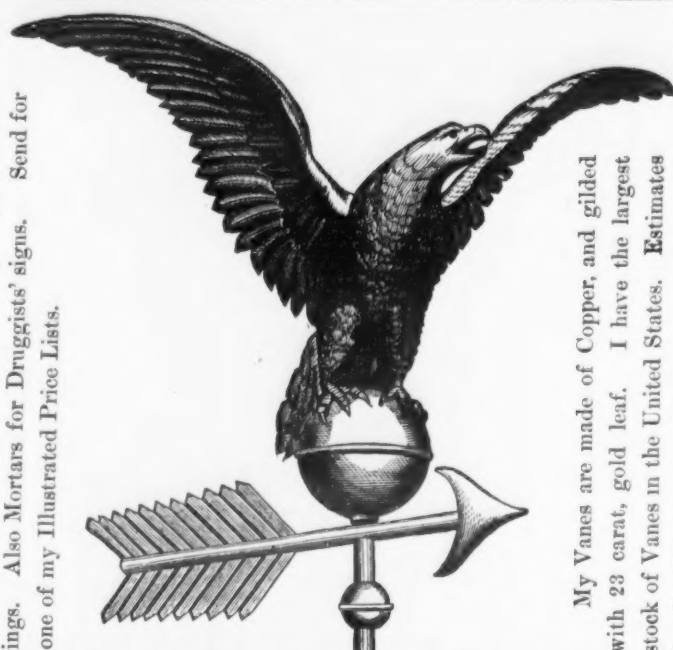
Among the Hardware exhibits we notice a file over nine feet in length, made by McCaffrey & Brother, polished and etched with allegorical designs. The Hart, Bilven and Mead Manufacturing Company and P. & F. Corbin have handsome cases, containing goods of their manufacture. The Branford Lock Works and Mallory, Wheeler & Co. have also a fine display, and the Yale Lock Company have erected a model post office. The Lalanc & Grosjean Manufacturing Company show a fine line of deep stamped tinware and other specialties. There are several very showy cases of cutlery, swords and other polished steel goods. The Stanley Rule and Level Company, L. Coes & Co., Leonard Bailey & Co., John Russell Cutlery Company, the Ames Mfg. Co., the Collins Co., and a host of others, deserve extended notice. There is a fine display of fire arms of every kind. Among the brass manufacturers we notice the Waterbury Brass Company and the Ansonia Brass and Copper Company. William D. Wood & Co., manufacturers of American Russia sheet iron, have made one of the most unique exhibits, and one that attracts much attention. The N. & G. Taylor Co. have a large and interesting exhibit of various forms and varieties of tin plate. The safe manufacturers make a large showing; also the scale makers.

There is a large showing of iron, coal and ore from various sections. Hussey, Wells & Co., Singer, Nimick & Co., the Edgar Thompson Steel Company, and the Cambria Iron Co. have exhibits that attract general attention.

The above brief reference to a few individual exhibits is all we are able to give in this issue. Our arrangements are such that we can promise full and complete reports on all subjects concerning which our readers will look to us for information. It will be at least two weeks, and probably more, before the work of preparation is completed, and during the remaining five months of the exhibition ample opportunity will be afforded for the closest and most critical examination of every department.

The heavy and long continued rains at the West have very seriously interrupted railway travel. Of the ten roads centering in Kansas City not one was able on the 6th inst. to send out trains on time, and on only two did any trains arrive. At that point all travel was interrupted for 24 hours, and wash-outs, landslides and similar accidents attending a flood were the order of the day. It is said that no such storm has visited that part of the country for the last 15 years. The damage done to private property has been very great. At some points the rain is reported to have continued for 60 hours.

Weather Vanes of every description, made from drawings. Also Mortars for Druggists' signs. Send for one of my Illustrated Price Lists.



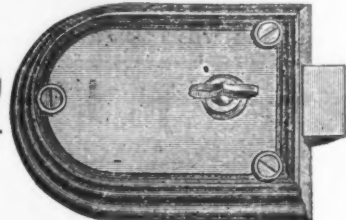
My Vanes are made of Copper, and gilded with 23 carat, gold leaf. I have the largest stock of Vanes in the United States. Estimates furnished for ornamental work.

V. W. BALDWIN, 213 Pearl Street, N. Y.
Manufacturer of
COPPER WEATHER VANES,
Emblematic Signs, Etc.



THE AMERICAN LOCK MFG. CO.,

Sole Manufacturers of the
FELTER PATENT
Locks & Latches,



Comprising
Upright Rim Dead Locks, Horizontal Rim Night Latches, Mortise Night Latches, Drawer, Desk, Cupboard, Box, Wardrobe, Tool Chest, and Pad Locks, &c., &c.

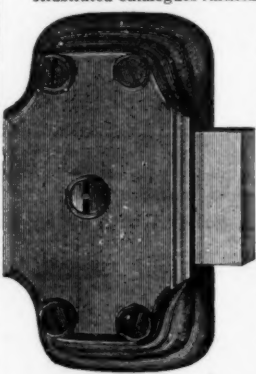
Each Lock is furnished with
TWO OR MORE SMALL, FLAT, STERLING METAL KEYS.

The Locks are fitted to the Keys and not the Keys to the Locks, and as no impression of the Lock can be taken, no false (or counterfeit) Keys can be made without the original Key to work from. The variation of one-fiftieth of an inch in any of the tumbler of the Lock from the position in which they are fitted, prevents the working of the Lock. Each Lock contains forty tumblers, each having five false notches, which bear upon the Key at two different points and are worked without the aid of any springs. All working parts of the Lock are made of fine brass, securely incased, and all bolts in the Locks are moved by an eccentric, hence there are no springs to break or wear out. When extra Keys are desired, one of the original Keys must be returned, as we do not duplicate by number. Illustrated Catalogues furnished upon application.

AGENCIES:

UNION NUT CO., 99 Chambers Street, New York.
MACOMBER, BIGELOW & DOWSE,
146 Oliver Street, Boston.
BIDDLE HARDWARE CO., 509 Commerce St., Phila.
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And Sold by the
LEADING JOBBERS IN HARDWARE
Throughout the United States and Canada.



J. CLARK WILSON & CO.,
MANUFACTURERS AND JOBBERS OF HARDWARE
51 Beekman Street, New York. P. O. Box 2355. Agents for
THE RADIAL STEEL COMPANY.

THE UNIVERSAL FAVORITE. A Rapid Knife Sharpener, Skewer Extractor, Cork Wire Cutter, and Cork Screw.



Cut of the "Nabob," with handle detached.

THE NABOB,

Especially designed for family use, but a wonderful sharpener of the largest knives, is imperfectly represented by this cut. The effect is very fine of its gleaming detachable radial blades and corrugated handle, which is marvelously neat, light and strong. It is Handsomely Plated, will last unimpaired a Lifetime. **Active SKREWERS**, is an Elegant and Useful Present, and one of the most universally needed and saleable of modern inventions. If families or public carvers remain without Radial Steels, knowing of their existence, it is simply because they fail to comprehend their worth. Price per dozen, \$15.



GREENFIELD TOOL CO.,

Greenfield, Mass.
Sole Manufacturers of the Celebrated
"Diamond" PLANE IRONS,



EXTRA PLATED TABLE CUTLERY. PATENT FORGED OX SHOES. The only shoe made with concavity to fit hoof. **BENCH AND MOULDING PLANES** of every description, &c., &c. Drop Forgings to order. Address for Catalogue with stamp.

HENRY DISSTON & SONS.



KEYSTONE SAW, TOOL, STEEL AND FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA, May 10, 1876.

TO VISITORS AT THE AMERICAN CENTENNIAL.

We invite the attention of mechanics and the trade of both hemispheres, to the great improvements introduced by us in the manufacture of Saws, which have been, and still are, our leading specialty.

It is not yet twenty years since the American market was almost wholly dependent upon foreign manufacturers for Saws of every description. It was not deemed possible to establish the industry here in successful competition with foreign makers, and the prestige which so long attached to English steel and English workmanship made it difficult to introduce American Saws and Tools to the trade. These obstacles to the successful establishment of an important American industry were overcome only by making better goods at a lower price than those which could be obtained abroad; and as pioneers of Saw manufacturing in the United States, we feel justly proud of the conspicuous success which has attended our efforts to supply American mechanics with the best tools ever made in any country of the world.

OUR DISPLAY AT THE EXPOSITION.

In support of our claims to pre-eminence in this department of manufacture, we call attention to the goods shown by us at the Centennial Exposition. These we have entered in competition for first honors with the best products of other manufacturers in this and other countries; and we are confident that for variety, finish, utility and general excellence, they will be found unequalled in any department of the exhibition.

OUR WORKS AND PRODUCTS.

In the eight succeeding pages we present to the trade and public illustrations of our works and many of our principal specialties. Our establishment is the largest of its kind in the world, and contains the most perfect machinery ever constructed for the manufacture of articles similar to those made by us. Beside Saws, we are large manufacturers of Files, Steel and Tools made from sheet steel. All our Saws are made from our own steel, which is in extensive demand among other tool makers.

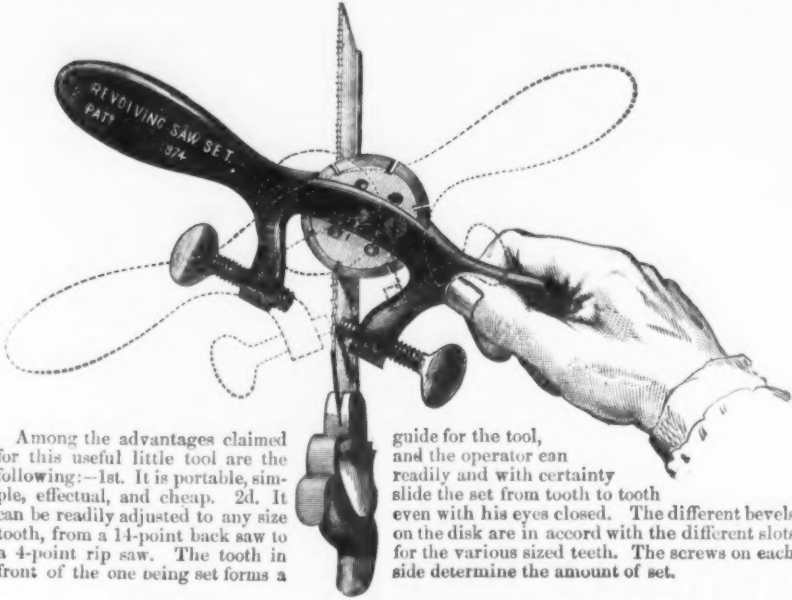
OUR WARRANTY, AND WHAT IT MEANS.

All goods marked "Disston" are Warranted. If found defective in any particular they may be returned to us, and new goods will be given in exchange for them.

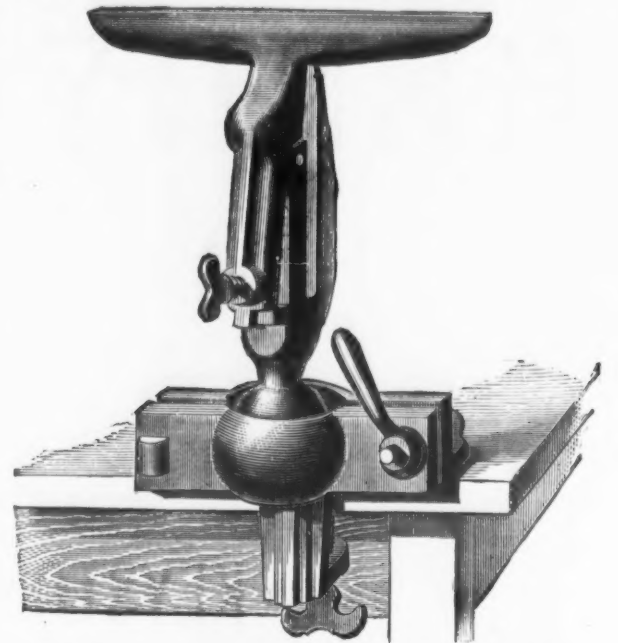
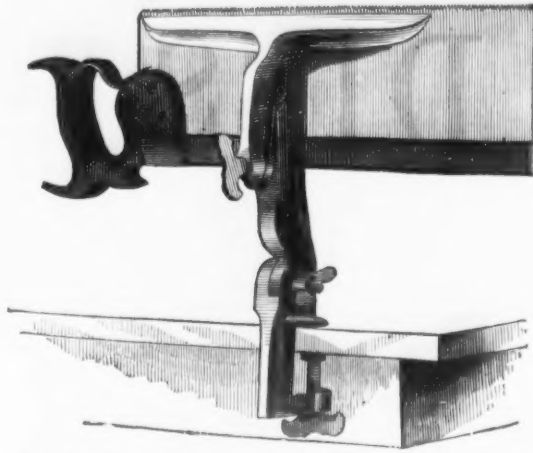
We take pleasure in extending to foreign visitors to the Centennial, as well as to representatives of the home trade, and all interested in the use or sale of such goods as we make, an invitation to inspect our works and warerooms. They are easy of access from any part of Philadelphia, and we think they will be found of interest as representing the progress and present condition of the art of tool manufacture in the United States.

HENRY DISSTON & SONS.

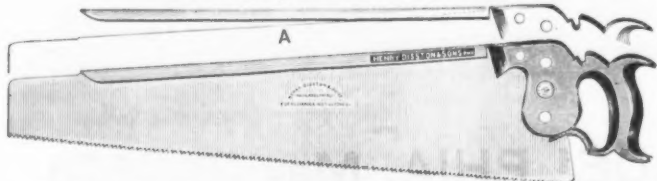
HENRY DISSTON & SONS' PATENT REVOLVING SAW SET.



IMPROVED UNIVERSAL SAW CLAMPS.



HAND SAW, with Movable Back.

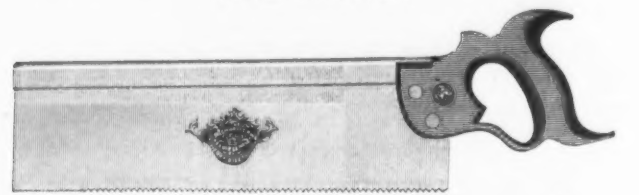


DISSTON'S IMPROVED PRUNING SAW AND KNIFE.

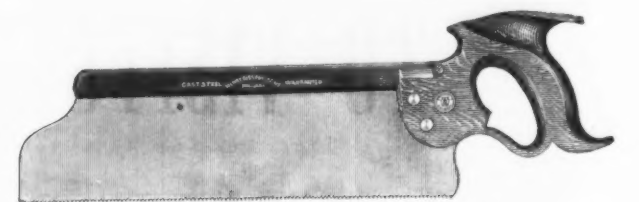
Patented August 29, 1873.



No. 77, BACK SAW. Disston & Sons, "Mechanics' Own," To run without set.



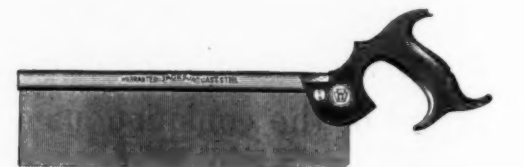
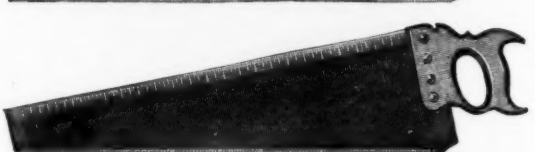
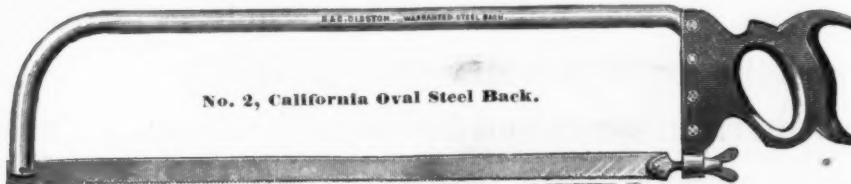
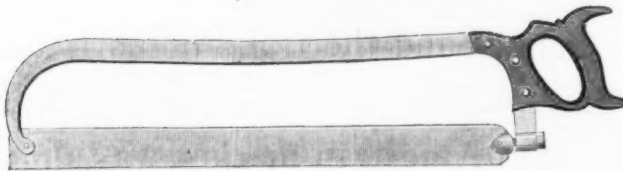
BUTCHERS' BOW BACK SAWS.



GENTS' HALF BACK BENCH SAW.



PANEL SAWS.



KEY HOLE SAW AND PAD, Very Cheap and Good.



COMPASS SAW.



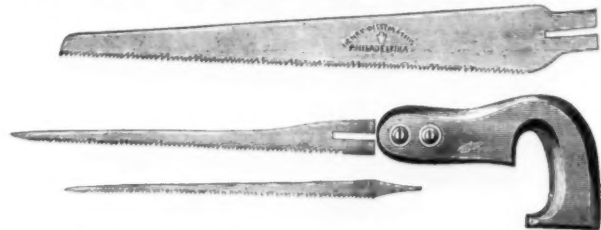
KEYSTONE TOOTH COMPASS SAW.



Compass Saws with Keystone Tooth, as per engraving above, for both ripping and cross cutting, 10 per cent. extra.

NEST OF SAWS.

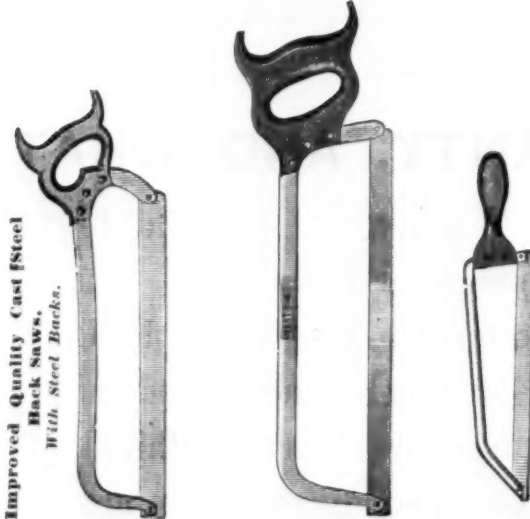
Combining one, each, Keyhole, Compass, Table or Pruning Saw,



These Saws are admirably adapted to Plumbers' use, where blades are frequently broken, as they can be immediately substituted in the same handle at trifling cost.

They will also be found a great acquisition to the Gentleman's Tool Chest, the three blades readily interchanging in the same handle. The large blade can be used as a Table or Pruning Saw, and the smaller ones as Lock, Compass or Keyhole Saws.

Improved Quality Cast Steel Back Saws, With Steel Backs.



MITRE BOX SAW. Special Back Saws for Mitre Boxes made to order.



THE COMBINATION SAW.



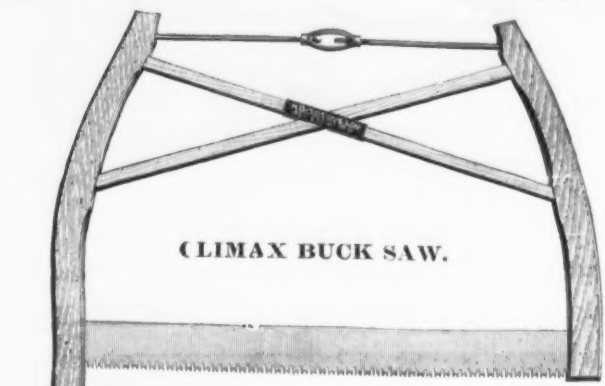
The Combination Saw, which we illustrate herewith, is an article which fills a long-felt want: it combines five tools in one, each tool as light as any one of the tools in separate form. This combination being made entirely of metal, and put together with metal, is always firm and true. No shrinkage can effect it. It is the most complete weather board Saw in the world, and with our little Pocket Level it presents a complete Plumb and Level, a Hand Saw, a good Square, and Rule.

IMPROVED REVERSIBLE HACK SAW.

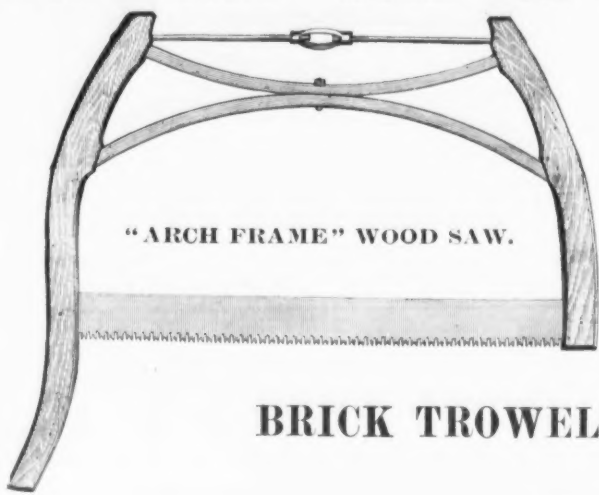


"DISSTON" SAWS are Warranted.

HENRY DISSTON & SONS' "BUCK" OR WOOD SAWS.



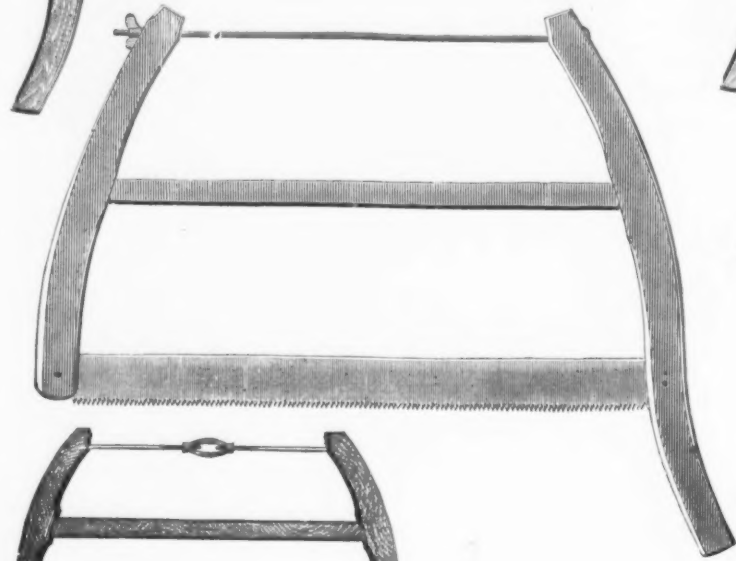
CLIMAX BUCK SAW.



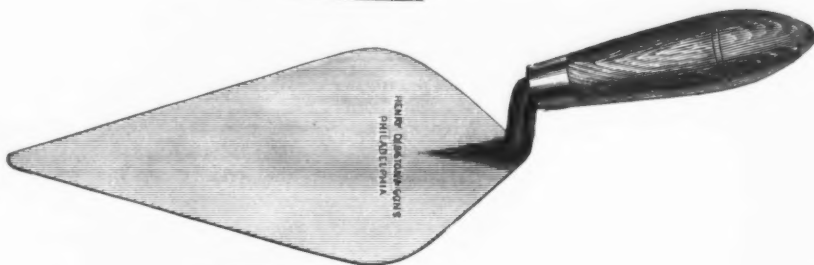
"ARCH FRAME" WOOD SAW.



DISSTON'S WOOD SAW FRAMES.

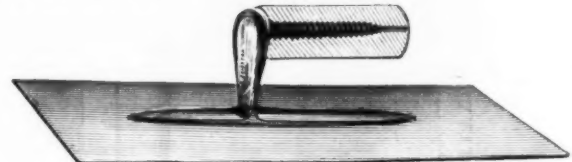


BRICK TROWELS.

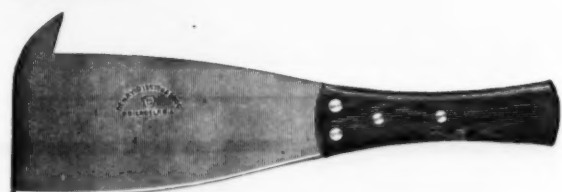


Improved Iron Frame Mitre & Square.

PLASTERERS' TROWELS.



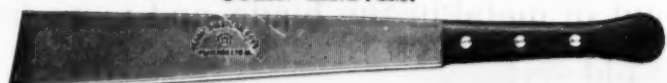
WARRANTED CAST STEEL CANE KNIVES.



PALLET KNIFE.



CORN KNIVES.



MOULDERS' TOOLS.

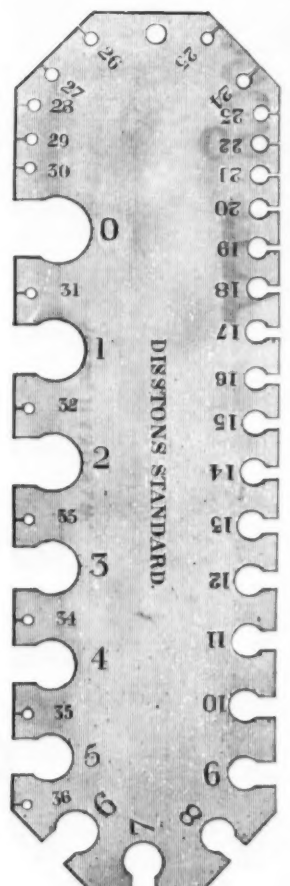
A practical moulder superintends the manufacture of these goods, which are made from the best quality cast steel, perfectly tempered, and warranted.



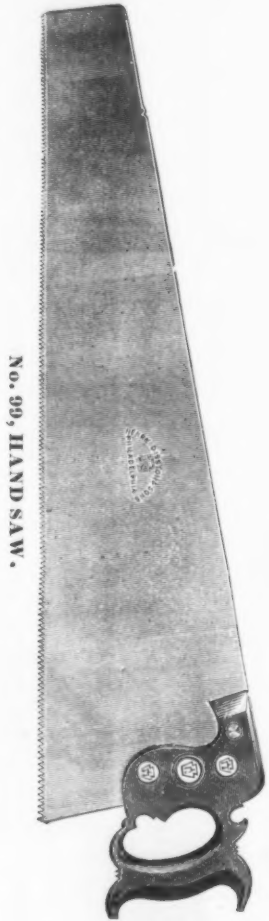
Moan Knife for Curriers.



All goods marked "DISSTON" are fully guaranteed.



All goods marked "DISSTON" are fully guaranteed.



No. 99, HAND SAW.



COMBINATION SAW.



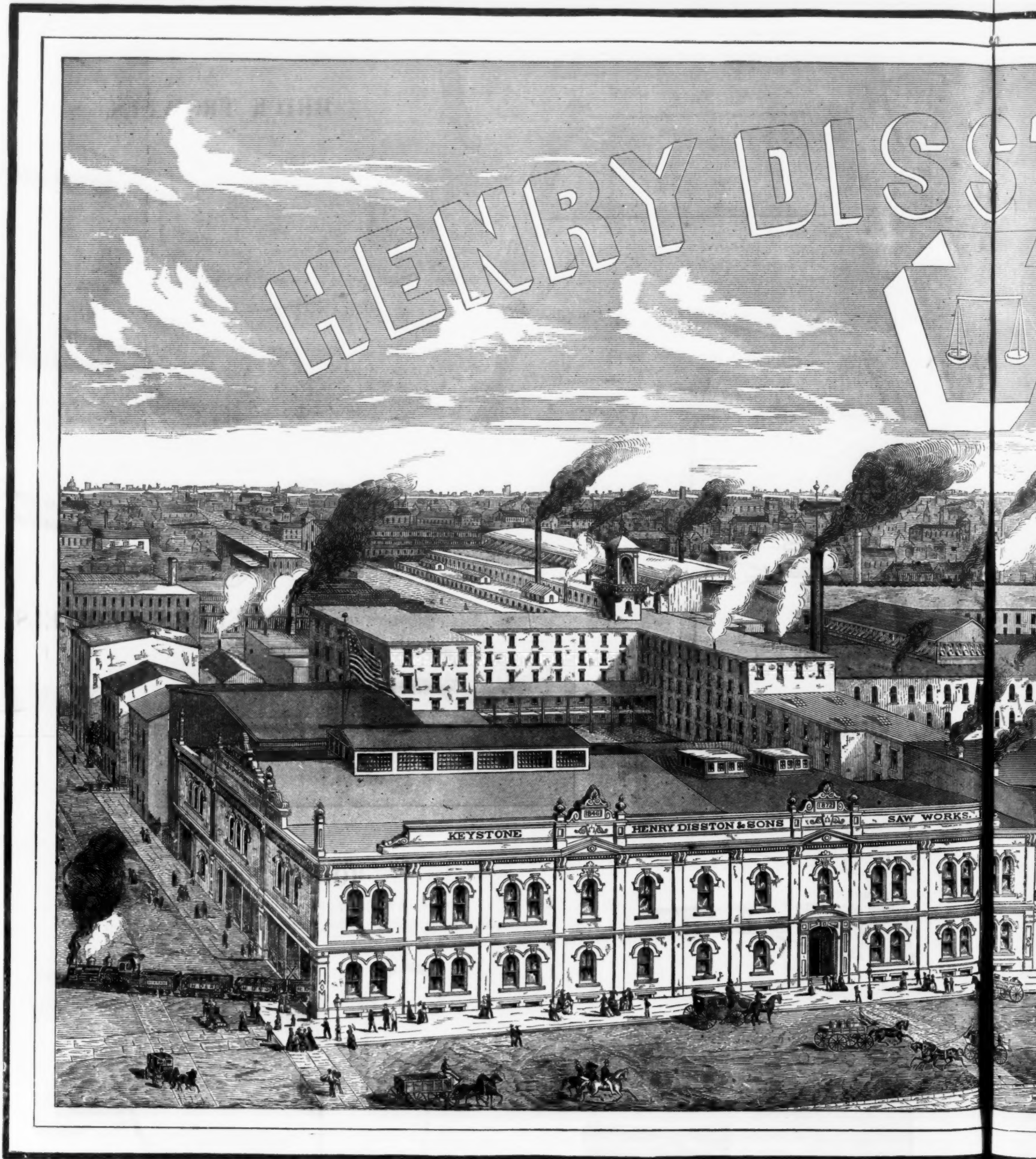
No. 12, HAND SAW.



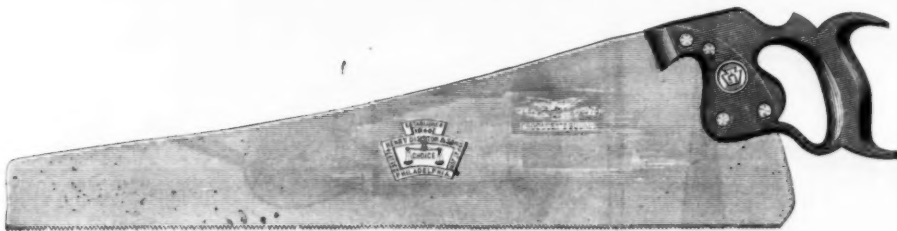
JAPANESE SAWS.



No. 29, HAND SAW.



HENRY DISSTON & SONS' PATENT

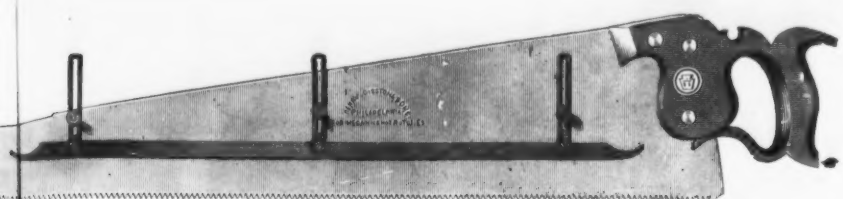


CHOICE No. 80.



"CENTEN" L No.

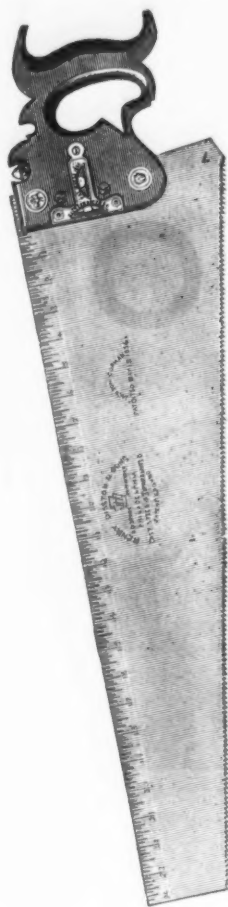
It is singular, yet true, that although immense improvements have been made, late y much resemble the Hand Saws of centuries ago. We have recently patented a Hand Saw w we l easy to handle, stronger in proportion to the amount of metal in the blade, and more free from remor handles, which possess many advantages over the old style.



GAUGE SAW, for Sawing a definite depth.



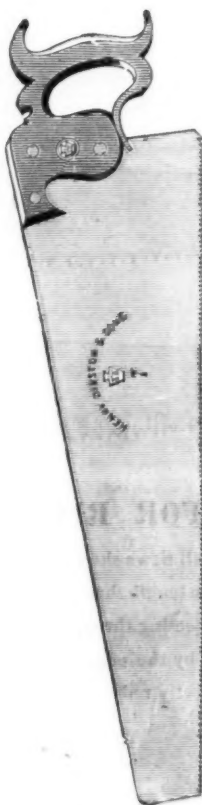
JAPANESE SAWS.



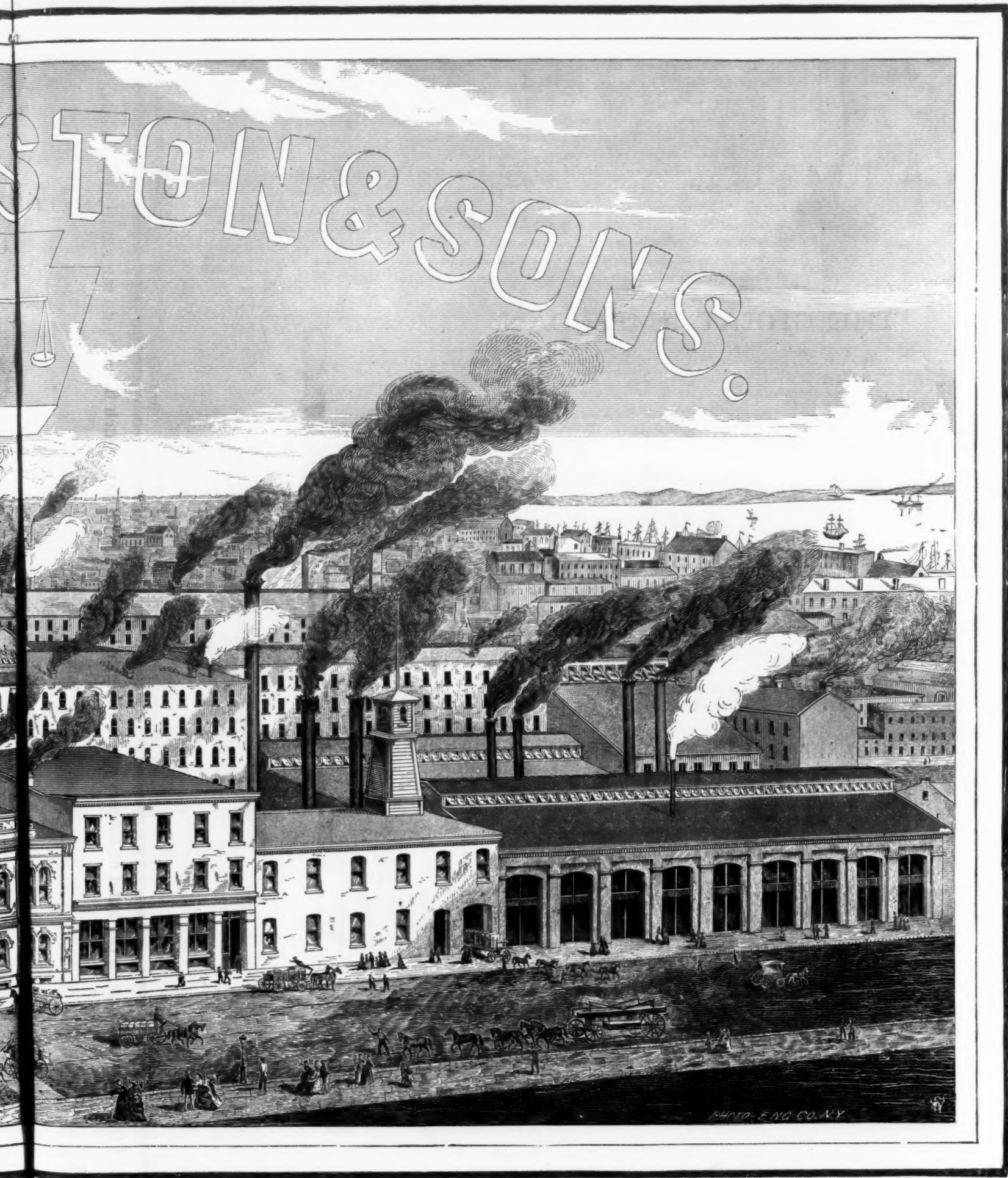
FULL COMBINATION SAW.



ADJUSTABLE HANDLE HAND SAW.



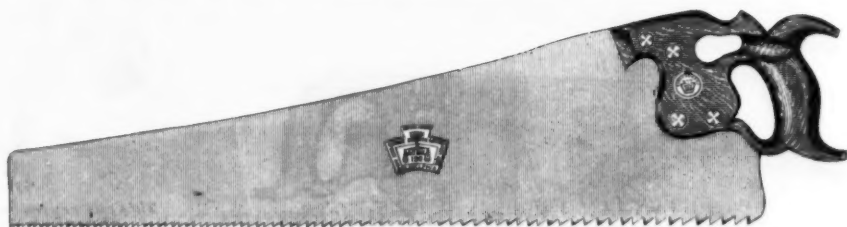
No. 7, HAND SAW.



PATENT SKEW BACK HAND SAWS.



Patent No. 76.



ACME No. 120

late years, in the grinding, temper, and finish of Hand Saws, still in shape and style they we believe combines numerous advantages over the old-style Saw, being lighter and more remor when in use than the ordinary Hand Saw. To these Saws are attached our new patent

Any Saw marked "DISSTON" proving defective will be exchanged.

ATTENTION! HALT!!

IMPORTANT to Hardware Dealers, Lumbermen, and all Parties interested in

CROSS-CUT SAWS.



The annexed engraving represents a section of "Lumberman" Cross-cut Saw, with File specially adapted for keeping said Saw in order. By using the File here illustrated, with the edge made to fit the gullet or space between the Teeth, and pressing downward while filing, you will preserve the original shape of the Teeth as described by dotted lines and notch in engraving. You pay for the edge of the file as well as the flat—then why not use it? and thus keep your Saw always gummy and in order, and avoid the risk of breaking or buckling the Saw by the old method of gumming. This File is manufactured expressly for the purpose of keeping in order the Teeth of our Improved Saws known as the Climax and Lumberman, and can be used with equal facility on either Saw. If the File be used according to our instructions, viz.: pressing down in the gullet at the same time the edge of the Tooth is being filed, the effect will be so convincing that persons will never return to the use of the old-style File, or any other of the so-called Improved Teeth. We also manufacture a File for keeping the Great American and Climax in order.

**Read,
Mark,
Learn.**

We guarantee our Cross-cut Saws to do more work, day in and day out, the season through, than any other Saw in the market.

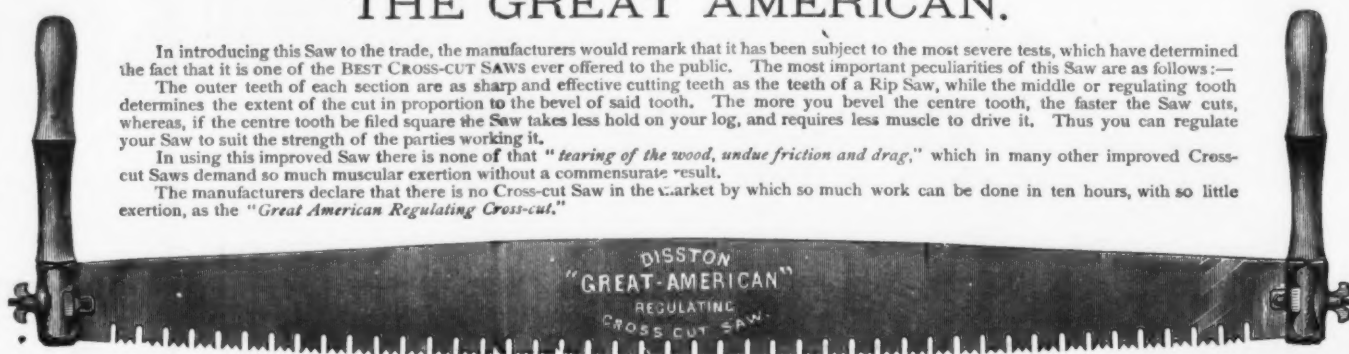
The test of practical experience has been applied, the

verdict given, the flat has gone forth, and the Humbugs are fast fizzling out, while our rapidly-increasing sales testify to the estimation in which these Saws are held.

We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

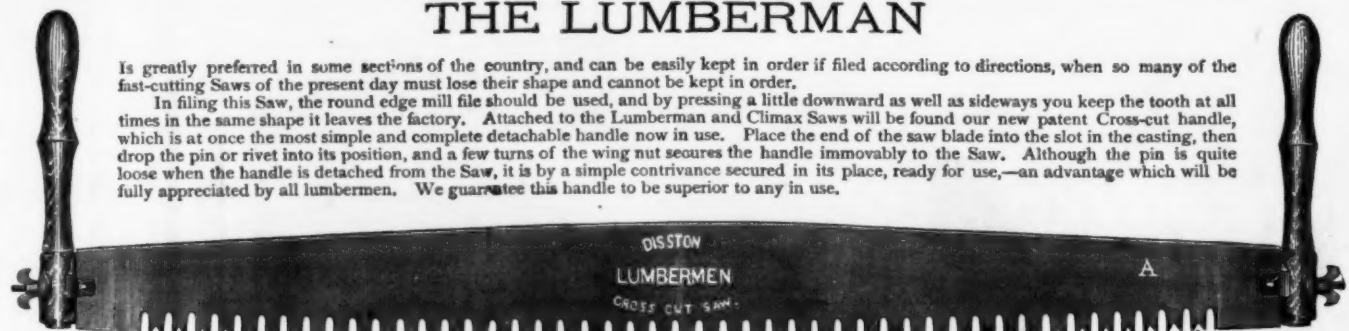
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—
The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.
In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."



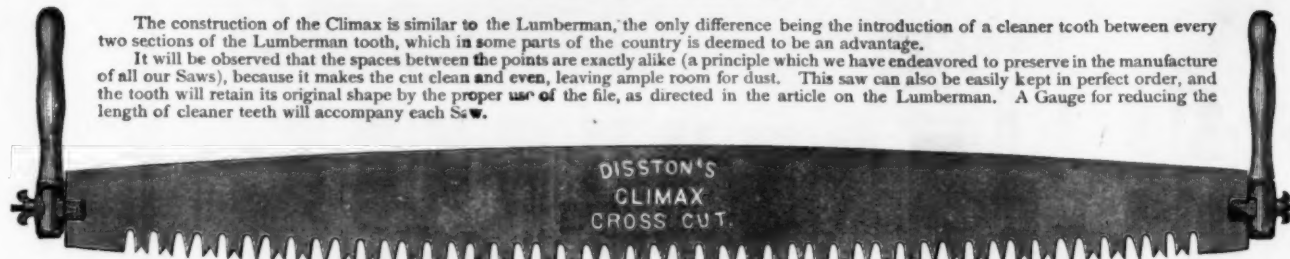
THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



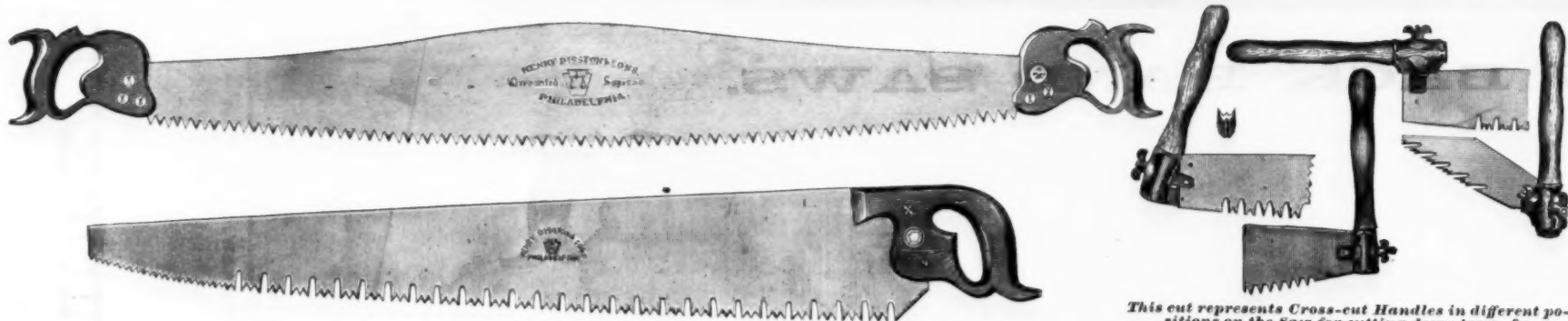
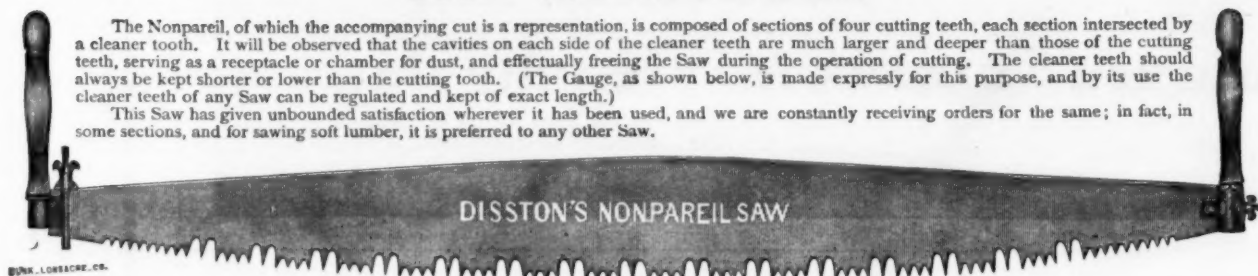
THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



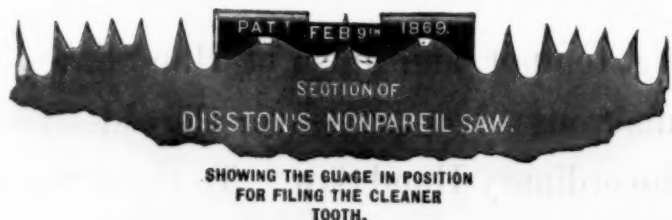
THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)
This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



GAUGE FOR REGULATING CLEANING-TEETH.

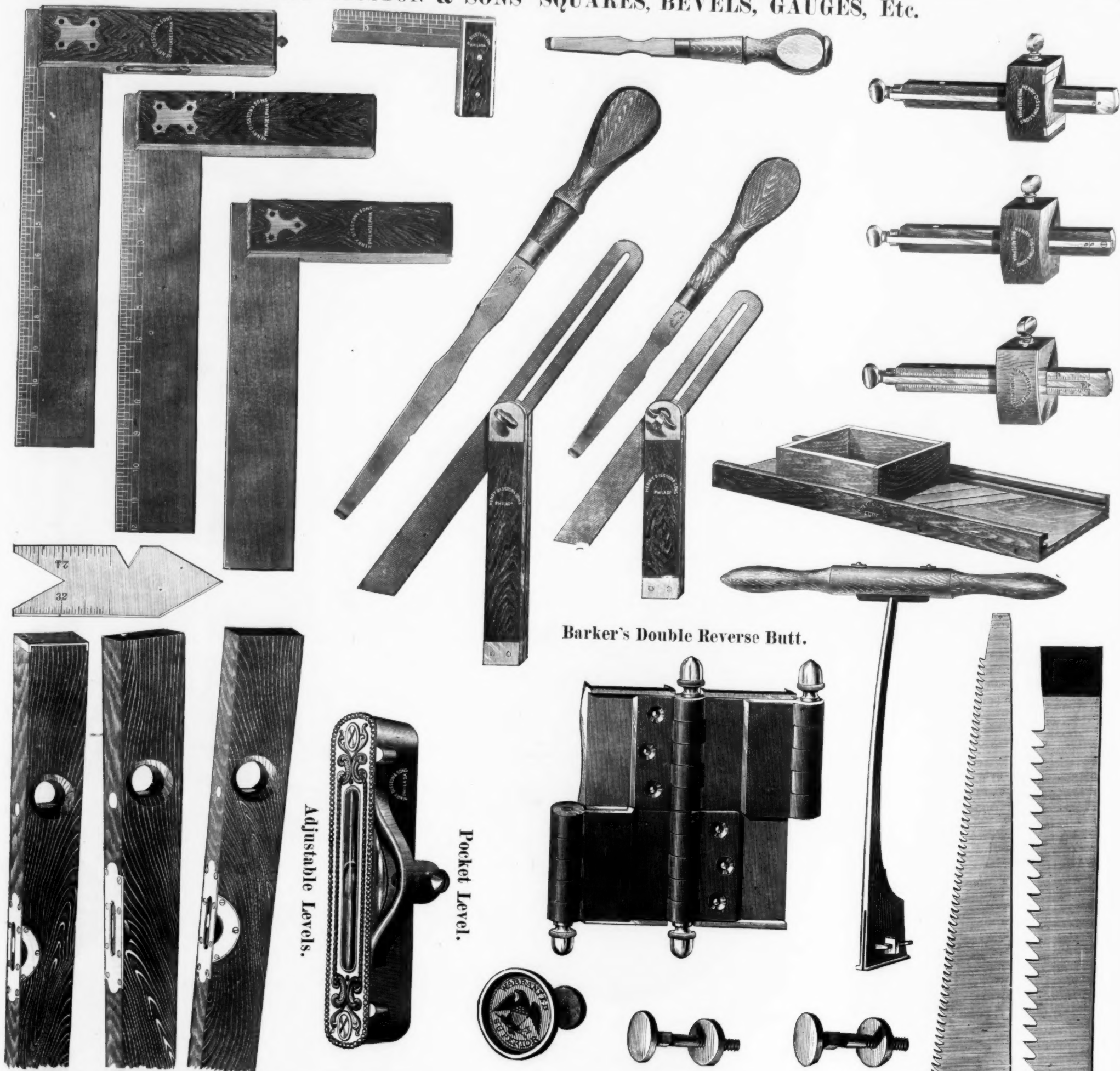
The Cleaning-Teeth of all Saws should be somewhat shorter than the Cutting-Teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the Cutting-Teeth, the Cleaning-Teeth projecting through the opening in centre of Gauge. Reduce the projecting points by means of a File, until arrested by the edges of the Gauge, which is made of hardened steel. Thus Tooth after Tooth can be rapidly and correctly reduced to an even length by any unskilled operator.



HENRY DISSTON & SONS.

The tip on the end of File is a protection to the hand or fingers when filing, which those who have much filing to do can readily appreciate.

HENRY DISSTON & SONS' SQUARES, BEVELS, GAUGES, Etc.

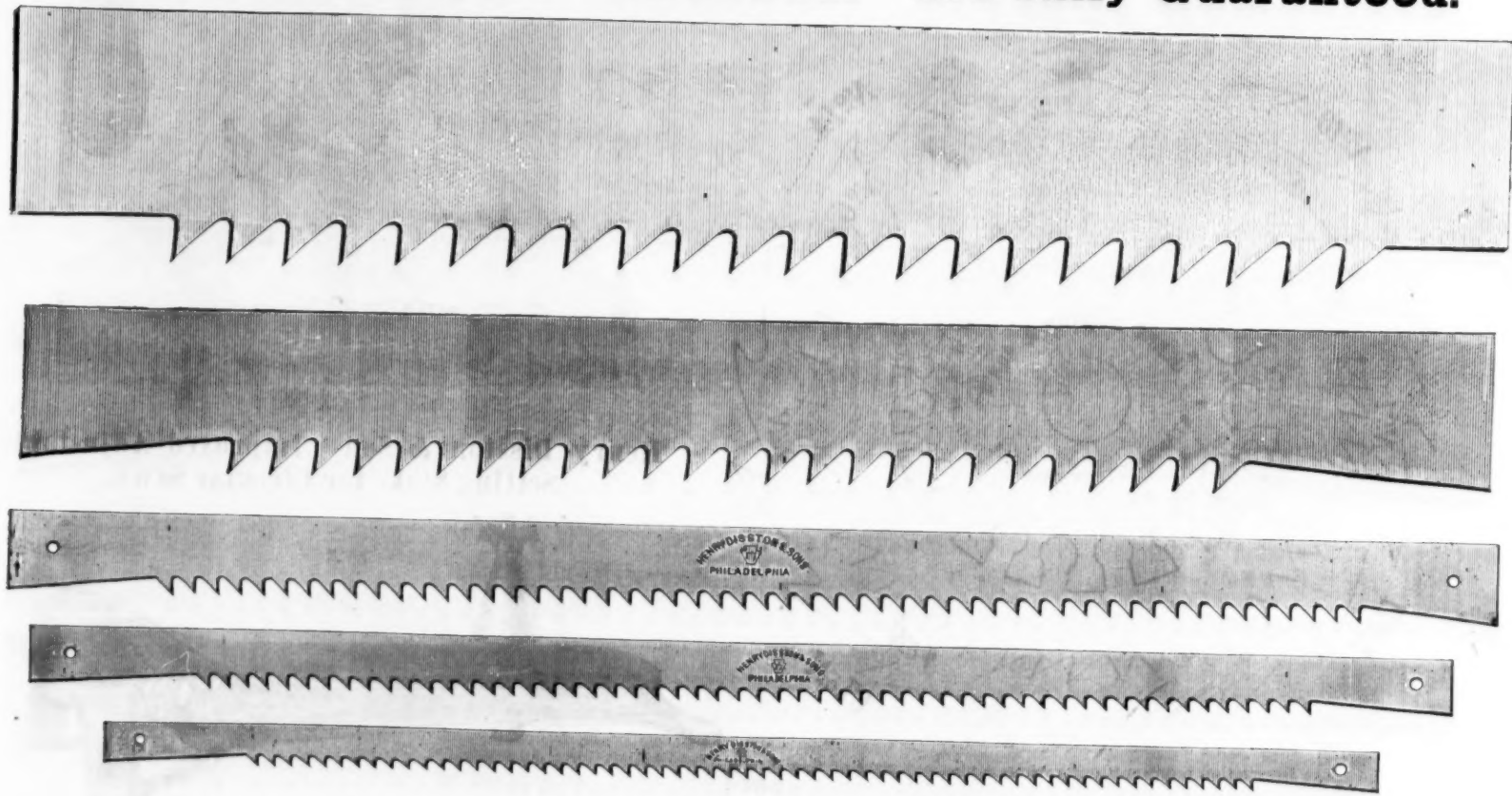


Barker's Double Reverse Butt.

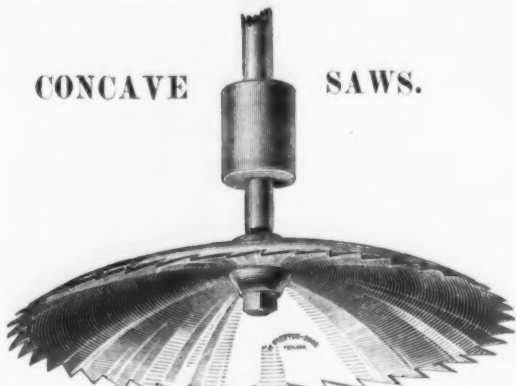
Adjustable Levels.

Pocket Level.

All goods marked "DISSTON" are fully Guaranteed.



CONCAVE SAWS.

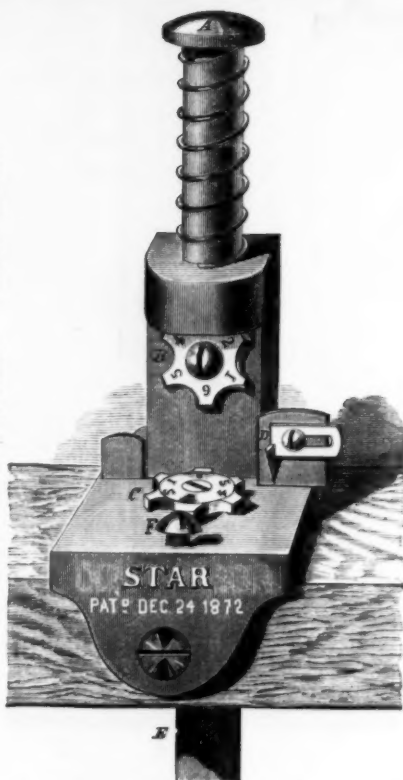


The attention of the manufacturers of chair or wheelwright lumber, barrels, etc., is respectfully called to Concave Saws, of which we are manufacturing large quantities. They are dished and tempered by an entirely new and patented process, and guaranteed to be of superior quality in every respect. We furnish these Saws considerably cheaper in consequence of our new mode of manufacture.

THE CONQUEROR SWAGE, JUMPER OR UPSET



DISSTON'S "STAR" SAW SET.



A is the plunger, which is operated by a treadle attached to E, under the machine; B, the hammer or striking part; C, the anvil; D, the movable gauge; F, the screw, to regulate the amount of set. The striking part and the anvil, or portion which receives the blow, are star-shaped and similar in construction. The points are all of different sizes, and are numbered from 1 to 6; and are designed to set different size teeth. Prominent among its advantages is the fact that it can be operated wholly by the foot by means of a treadle, thus leaving the hands to guide and manipulate the saw.

Disston's Patent Gullet-Tooth Circular Saw.

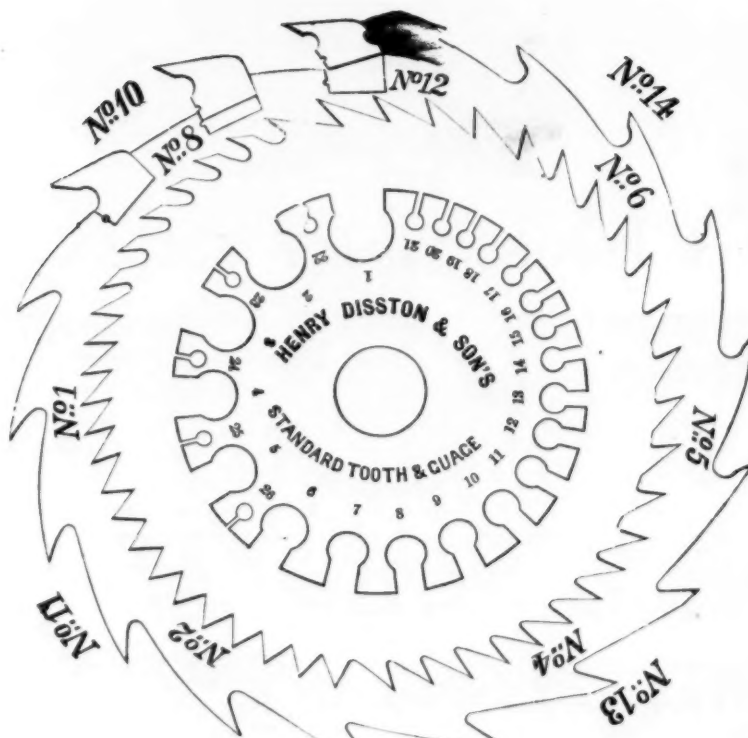
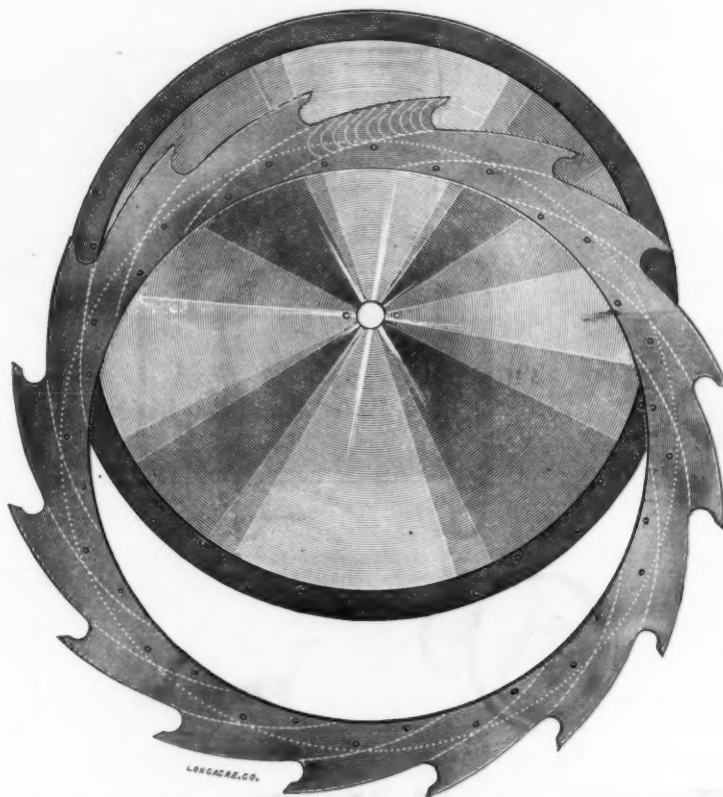


By reference to the above engraving, it will be observed that the back or point line of each Tooth is the continuation of the spiral lines Z, and the sharpening is mainly done by the reduction of the Gullet or Throat only. This is readily accomplished by the use of our Patent Gummers.

The course pursued by the cutter is spiral, and while it is in the act of reducing the front or throat of the Tooth D, it is prolonging the back or point-line of the Tooth C. The engraving represents a two-inch tooth or Gullet. The Saw B is the Saw A worn down. When the Saw has been reduced on center line from G to F, it has been worn away but six inches, yet has presented a cutting surface on spiral line Z from G to Y, a distance of twenty-four inches. But this is only one of the advantages claimed for our Patent Gullet-Tooth. The Throat or Gullet being chambered out on a half-circle, forms a receptacle or chamber for dust, and thus a one-and-a-half-inch Tooth of this pattern will keep a Saw as free from choking as a two-inch Tooth of the ordinary shape.

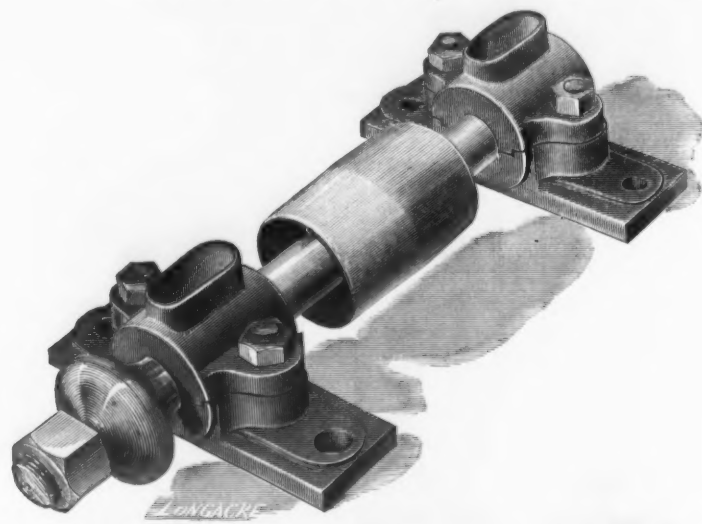
The saving of the Saw-Plate by the use of a smaller Tooth is evident to the most casual observer. In wearing a fifty-four-inch Saw down to a forty-two, a loss of twelve inches has been sustained in the diameter of the Saw-Plate, which is six sets of two inch Teeth, or eight sets of one-and-a-half-inch Teeth, an advantage of two sets in favor of our new Patent Gullet-Tooth, independent of the immense gain by gumming on spiral lines. The crowning triumph of this Saw is the fact that it can be kept in order with one-tenth the labor of any other Saw, and is bound to preserve its true circular shape; whereas, by the old method of filing both on back and front it is impossible to keep a Saw round.

RIM SAW.



The above illustration represents our various styles and sizes of Saw Teeth, also our Standard Gauge. By consulting it a person will be enabled to inform us the size and style of Tooth, and also the gauge of any Saw he may desire.

CIRCULAR SAW MANDRELS.

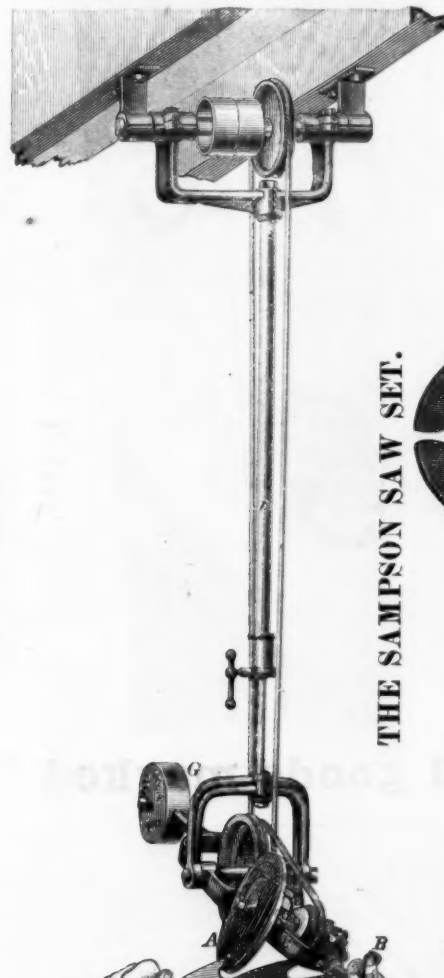


AUTOMATIC SAW FILER.



Any Saw marked "DISSTON" proving defective will be exchanged.

Borthwick's Patent Swinging Saw Sharpening Machine.



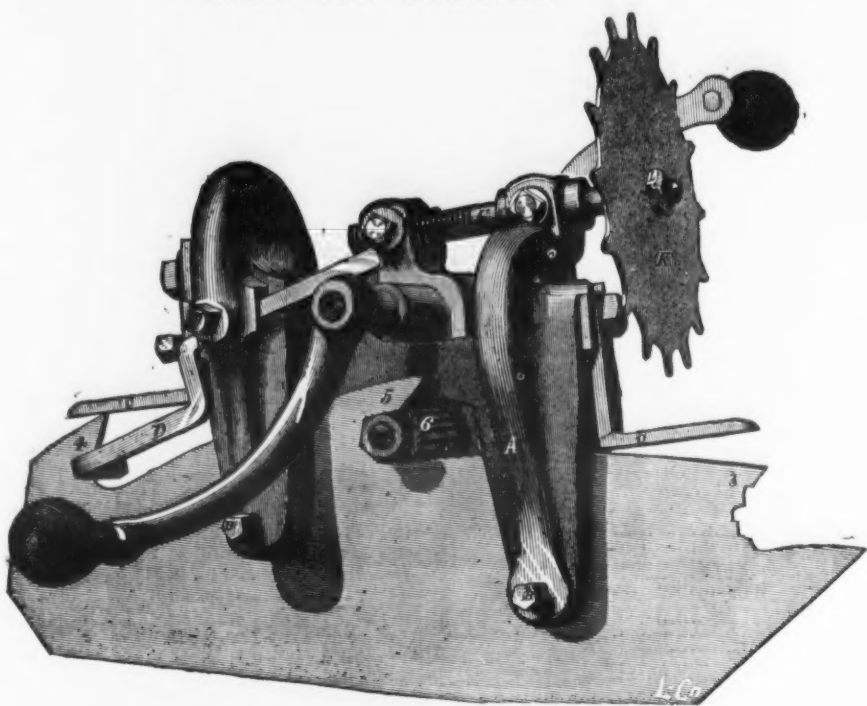
THE SAMPSON SAW SET.



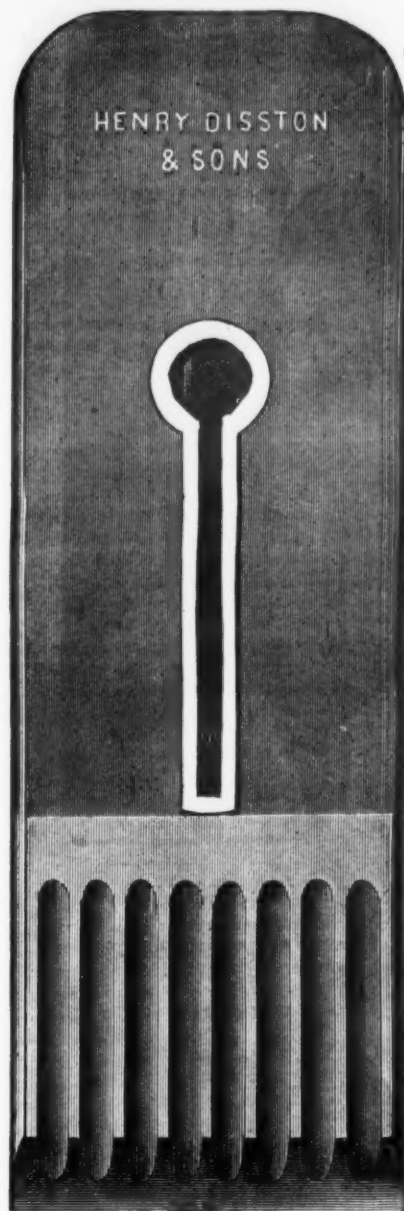
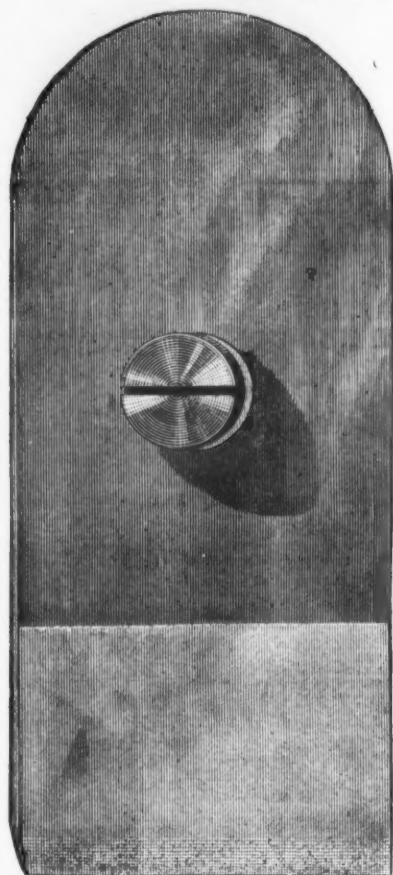
Henry Disston & Sons' Improved Adjustable Setting Stake for Circular Saws.



STAR SAW GUMMER.



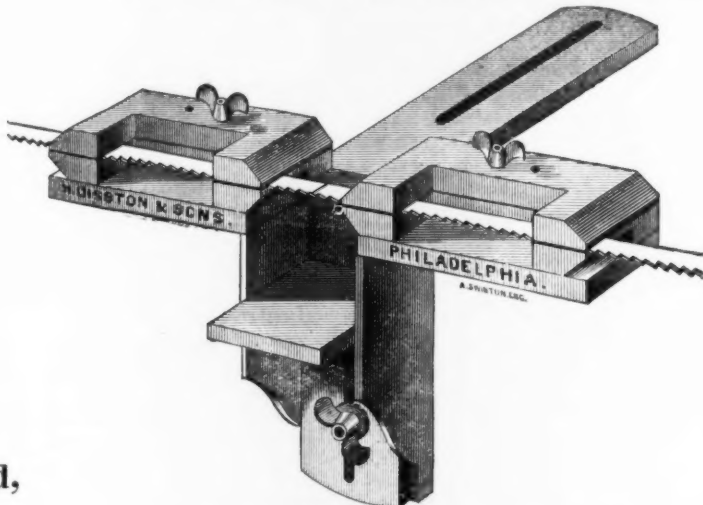
IMPROVED PLANE BITS.



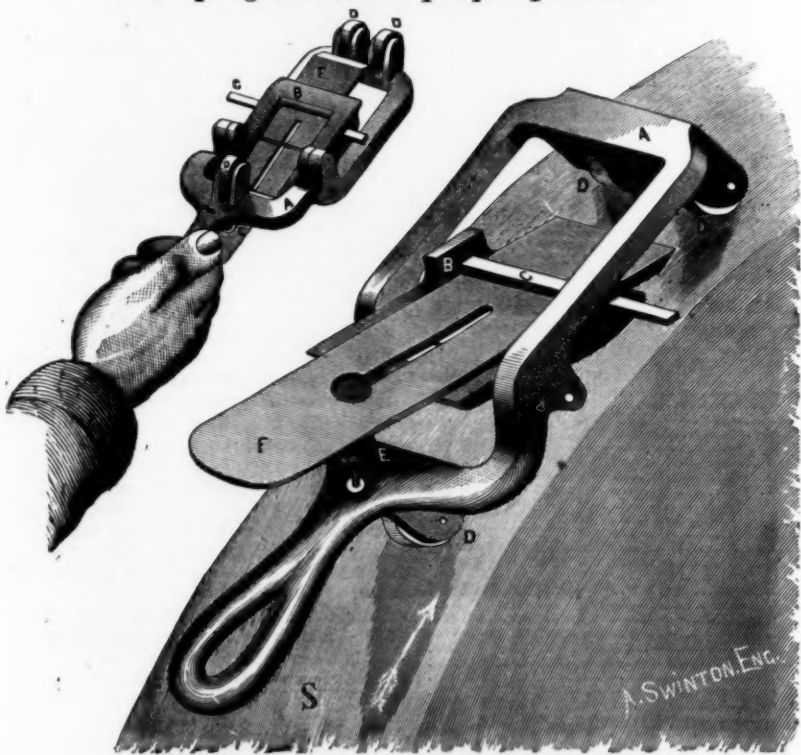
Frame for holding a Gummer Cutter while being ground.



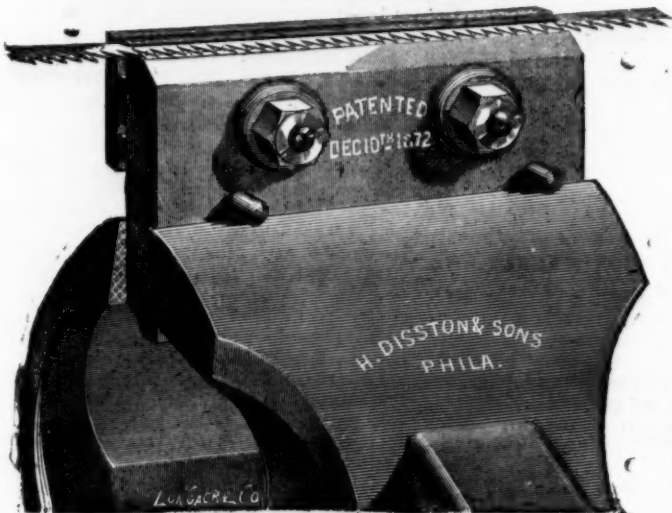
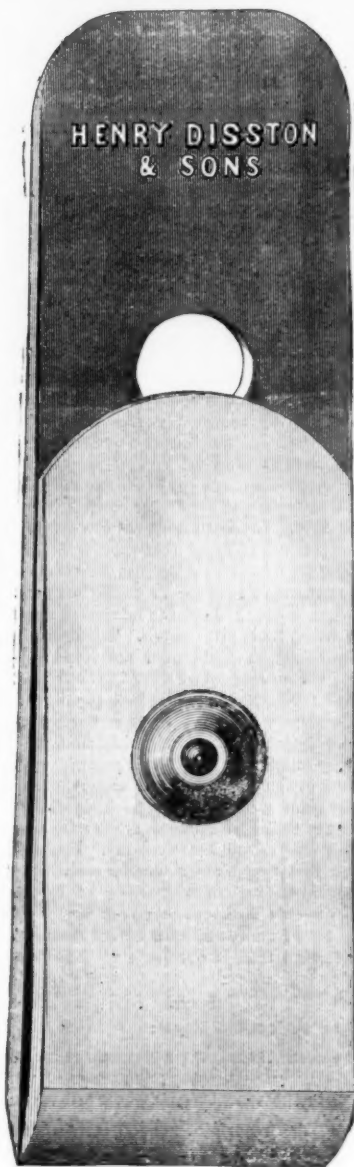
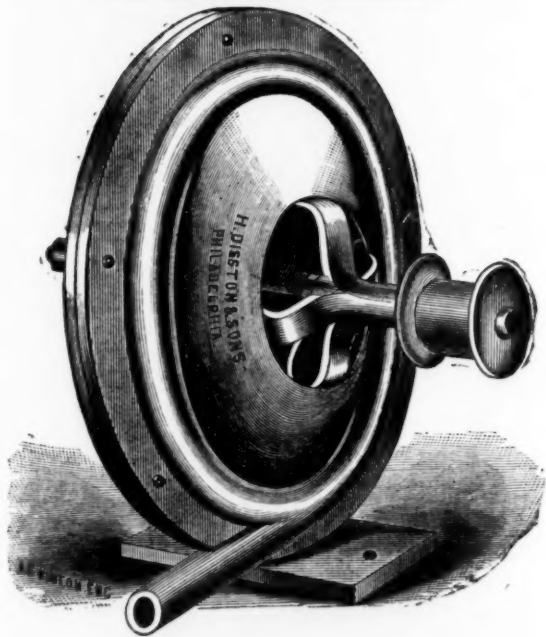
This cut represents a machine for Brazing Band Saws 2 inch wide and under.



Frame for holding a Plane Bit while being ground, keeping the bit in proper position.



This cut represents a small Blower for Band Saw Machine.



HENRY DISSTON & SONS' Patent Setting Stake

For Setting Web, Jig, Band or any kind of Narrow Saws.

The principal difficulty experienced in setting a narrow Saw arises from the fact that the blade is liable to tilt or slide backward as each successive tooth is struck by the hammer. The back guide with its projecting lip, under which the Saw passes and is securely held during the process, effectually prevents these difficulties and holds the Saw up to its work; thus the operator is enabled to strike the tooth with certainty every time, and prevents any distorting of the saw blade.

The guide can be adjusted to various widths, by inserting or removing packing, as occasion may require. Either edge of the set can be used by reversing the back guide, and as the edges are of different sizes, they are adapted to Saws of different widths. A narrow Saw set by the aid of this Stake remains as straight after as before; a result which cannot be attained by any other means.



Trade Report.

Office of THE IRON AGE.
WEDNESDAY EVENING, May 10, 1876.

The past week has been one of very moderate activity in Wall street, owing to the absence of a speculative disposition among the leading spirits of the several markets. Money is abundant and easy. Borrowers on call have been freely accommodated at 3½ @ 4 per cent, and the rate of discount for prime business paper is 4½ @ 6 per cent. Business of all kinds is suffering from an almost unprecedented dullness, and several heavy failures have been reported—notably among New England manufacturers of cotton cloths. The opinion prevails that we are now passing through the period of greatest dullness and depression immediately preceding a recovery of individual and commercial activity. This may be true, but we fail to discover indications of immediate improvement, unless such improvement shall result from the Centennial. There are many reasons to think that this will help all kinds of business to a moderate extent, and set a great deal of money in circulation, but there seems to be very little purport of a general and healthy revival until after the presidential canvass. The currency question is now in good shape, and if the results of the fall elections are not such as to involve the future of financial legislation in uncertainty, we may consider ourselves as steadily tending in the direction of specie payments. This is the only solution of our paper money difficulties in which the country would feel any degree of confidence, and no party can hope to carry the country which does not squarely and honestly pledge itself to honor all our national obligations in coin or its equivalent. As a political issue currency inflation is a thing of the past, and there is no reason to think that it will have weight in political circles.

The gold market has been very steady during the week, and the fluctuations in the premium have been between 12½¢ and 12¾¢. The following table shows the highest and lowest daily quotations in the gold room:

	Highest.	Lowest.
Thursday..	112½	112½
Friday.....	112½	112½
Saturday.....	112½	112½
Monday.....	112½	112½
Tuesday.....	112½	112½
Wednesday..	112½	112½

On Friday the Secretary of the Treasury gave orders to pay out subsidiary silver coin for currency drafts. The effect of this was to completely remove all present danger of a scarcity of "change," and silver, which had been worth a premium, at once fell to par.

There has been a moderate activity in government bonds during the week, and prices have been quite steady. Investment securities of all kinds are dull and steady, especially railroad securities.

The stock market, which at the date of our last report was somewhat depressed, has been unsettled and feverish on account of the breaks in railroad freights and telegraph charges, and the illness of Mr. Vanderbilt. The principal dealings have been in Lake Shore, Western Union, Michigan Central, St. Paul, Pacific Mail, New York Central and Erie.

The following is a comparison of the bank averages for the past two weeks:

	April 29.	May 6.	Differences.
Loans.....	\$232,117,300	\$237,015,600	Inc...\$4,898,300
Specie.....	17,076,600	18,864,400	Inc... 2,787,800
Legal tend's.....	43,089,300	39,182,200	Dec. 3,907,100
Deposits.....	302,539,100	305,669,000	Inc. 3,129,900
Circulation	16,262,800	16,199,400	Dec... 63,400

The changes above noted are chiefly due to the Treasury operations in connection with the payment of the adjusted claims under the Geneva award. Although the \$5,883,000 five per cent. bonds sold by the Treasury to procure the means wherewith to pay, were sold for gold April 24, they were not paid for until April 27—the same day on which the gold was sold for currency; the buyers of this gold had four days in which to pay for it, so that the effect on the bank figures was apparent in the last bank week—which began Saturday morning, April 29, and ended Saturday, the 6th. The Treasury has been taking in legal tender notes and paying out gold on account of the \$5,883,000 bond operation. In addition it has been paying out gold for May interest, and it is probable that the New York banks hold actually more gold than they appear to by this statement, even making allowance for to-day's export, which does not count in this week's bank statement, and for the ordinary customs receipts paid from the bank vaults into the Treasury. It is also probable that they hold a smaller amount of legal tender notes than they appear to by this statement—this although currency has been coming here from the interior during the week.

The foreign trade movements are shown in the following tables:

IMPORTS.			
	1874.	1875.	1876.
Total for week..	\$6,515,087	\$8,267,835	\$8,032,744
Prev. reported..	144,711,176	134,616,859	111,725,687
Since Jan. 1....	\$151,226,213	\$133,181,004	\$116,778,431

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Brass goods.....	17	\$4,383
Bronzes.....	59	3,306
Chains and anchors..	29	390
Cutlery.....	1	10,045
Cups.....	10	1,188
Hardware.....	10	1,859
Iron, pig, tons.....	10	1,384
Iron, cotton tire.....	38	331
Iron ore, tons.....	155	303
Iron ore, other, tons..	63	4,754
Lead, pigs.....	1	1,580
Metal goods.....	197	18,296
Nails.....	3	744
Needles.....	7	2,957
Old metal.....	17	7,129
Railroad.....	17	607
Steel.....	1,305	25,354
Tin, boxes.....	13,940	80,022
Tin, 4144 slabs.....	440,521	78,108
Wire.....	1,343	6,800

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended May 9:

	1874.	1875.	1876.
Total for week..	\$4,454,367	\$3,908,621	\$5,063,313
Prev. reported..	96,245,837	81,236,344	82,636,975
Since Jan. 1....	\$100,700,304	\$85,144,985	\$87,702,288

EXPORTS OF SPECIE.

For the week ended May 6:

	1874.	1875.	1876.
Total for week..	\$11,175	\$11,175	\$11,175
Previously reported.	1,546,539	1,546,539	1,546,539

Total since Jan. 1, 1876.....\$1,537,704
Same time in 1875.....5,779,146
Same time in 1874.....1,539,673
Same time in 1873.....1,653,692
Same time in 1872.....639,612

Government bonds at the close were quoted as follows:

	Bid.	Asked.
U. S. Currency 6s.....	127½	127½
U. S. 6s 1881, reg.....	121½	121½
U. S. 6s 1881, cou.....	121½	121½
U. S. 5-30 1883, reg.....	114½	114½
U. S. 5-30 1883, cou.....	114½	114½
U. S. 5-30 1885, new reg.....	113½	113½
U. S. 5-30 1885, cou.....	113½	113½
U. S. 5-30 1887, reg.....	118½	118½
U. S. 5-30 1887, cou.....	118½	118½
U. S. 5-30 1889, reg.....	120½	120½
U. S. 5-30 1889, cou.....	120½	120½
U. S. 5-30 1891, reg.....	122½	122½
U. S. 5-30 1891, cou.....	122½	122½
U. S. 10-40 reg.....	117½	117½
U. S. 10-40 cou.....	117½	117½
U. S. 5s, 1881, reg.....	117½	117½
U. S. 5s, 1881, cou.....	117½	117½

The following were the closing quotations of active stocks:

	Bid.	Asked.
Atlantic & Pacific R. R. Preferred.....	2½	3½
Atlantic & Pacific Telegraph.....	17½	18
Chicago & Northwestern.....	40	40½
Chicago, Rock Island and Pacific.....	105	105½
Chic. Bur. & Quincy.....	117½	118
Col. Chic. & Ind. Cent.....	49	49½
Clev. Col. Cin. & Ind's.....	49	50
Cleveland and Pittsburgh.....	94½	95
Chicago & Alton.....	97	98½
Consolidation Coal.....	104½	105
Canton.....	42	42
Del. Lack. and Western.....	105½	106
Delaware & Hudson Canal.....	110	111
Adams Express.....	109½	110
American Express.....	62	62½
United States Express.....	70½	71
Wells, Fargo & Co. Express.....	87½	88
Erie.....	15½	16
Harlem.....	137	138
Hannibal & St. Joseph.....	14½	15
Illinois Central.....	34	35
Indiana & Texas.....	96½	97
Lake Shore.....	54½	55
Michigan Central.....	46½	47
Morris & Essex.....	103	104
Minneapolis & St. Paul.....	54½	55
Mariposa.....	7	7½
New York Central.....	74	75
New Jersey Central.....	110	110½
New York Southern.....	13	14
Ohio & Mississippi.....	18½	19
Pacific Mail.....	19½	20
Panama.....	112½	113
Pittsburgh & Fort Wayne.....	102	103
Pacific of Missouri.....	18	19
Quicksilver.....	15½	16
St. L., Kan. City Northern.....	30	31
Tol., Wabash & Western.....	23	24
Union Pacific.....	61½	62
Western Union Telegraph.....	66½	67

GENERAL HARDWARE.

We cannot report any improvement in business, and no changes of importance have occurred in quotations during the week. In Foreign Hardware trade seems even more depressed than in domestic goods, but it being pretty generally conceded that prices have touched bottom, no disposition is manifested on the part of importers to force sales by concessions.

J. Clark Wilson & Co. quote D. H. Whittemore's Apple Parers, improved for 1876, at the following net prices:

Bay State.....	per doz., \$13.50
Skeleton.....	8.00
Union.....	8.00

We print on page 19 an article illustrating these goods, to which we invite attention.

Peace & Hogan have issued the following revised discount sheet, under date of 1st instant:

	VULCAN SAW WORKS.
UNION AVENUE, TENTH AND ANSELIE STS.,	
BROOKLYN, E. D., N. Y.	

DISCOUNT SHEET.

	Dis. percent.
8. Circular Saws, from 4 to 46 inch inclusive.....	25
9. Circular Saws, 48 inch and larger.....	25
9. Circular Top Saws.....	25
9. Setting, Sharpening and Repairing Saws, net cash.....	15
10. Standard Wire Gauges.....	15
11 & 12. Mill, Gang and Mulay Saws.....	25
13 to 16. Pit Saws, Ice Saws and Cross-Cut Saws.....	25
16. Patent Cross-Cut Saw Handles.....	25
17 to 20. Billet Webs and Wood Saws.....	25
21 & 22. Wood Saw Rods.....	25
21. Chair and Fellow Webs.....	20
22 to 29. Hand, Back, Butcher Saws, etc.....	20
30. Cabinet Scrapers, Planing Tools, and M.....	10
30. Trench Rods.....	10
30. Saw Screws and Handles.....	10
30. Fay's Patent Scroll Saws.....	25
30. French Steel Band Saws.....	15

Note error in page 25 "Carpenter's Delight" Hand Saws 36 inch, should read 26 inch.

Note omission on top of page 27, and add "Table and Pruning Saws" to "No. 30, Etched, B. P. Baldwin."

We have introduced our new Centennial Saw number 1876, a superior article worthy of the special notice of the trade. It is made of double refined Spring Steel, warranted; full polished apple handle, and with five flush barbed and polished brass screws. The screws being finished before insertion into the handle, can be readily tightened with a screw driver should they become loose, and still keep a good finish.

Inch.	14	16	18	20	22
Per doz.....	\$15.50	17.00	18.50	19.50	21.25
Inch.....	24	26	28	30	32
Per doz.....	\$23.00	24.75	27.00	29.00	31.00

This and all our best Saws will in future be made rounded at the heel to prevent catching in the wood.

The above are factory rates for the trade, and bills unpaid when due will be drawn for at sight, and if not honored, an interest of 10 per cent. will be charged from the 1st of the succeeding month.

PEACE & HOGAN.

The following circular explains itself:

Office of P. & F. CORBIN,
NEW BRITAIN, CONN.,
NEW YORK, No. 87 Chambers Street,
May 1st, 1876.

DEAR SIR: Presuming you intend visiting the International Exhibition at Philadelphia, the present year, we desire to call your attention to our display of Fine Builders' Hardware, located in the Hardware Department of the Main Building on the main aisle.

We shall have on exhibition specimens of our Locks, Latches, Butts, Bolts, &c., finished in Solid Bronze Metal, Nickel and Verde Antique, and Enamel Bronze, designed especially for the finer class of public buildings, churches, colleges, school houses and private residences. Also, specimens of Architectural Bronze Work, which we are prepared to furnish to order, of the most approved designs.

We also manufacture a full line of the cheaper class of Builders' and Miscellaneous Hardware, which our limited space would not permit us to exhibit, but would refer for further particulars to our Illustrated Catalogue to be found at the Exhibition. Hoping to receive a call from you, we are,

Yours, very truly,
P. & F. CORBIN.

C. G. Blatchley, No. 506 Commerce street, Philadelphia, illustrates in his advertisement on page 11 "Blatchley's Horizontal Ice Cream Freezer," to which we invite attention. These Freezers are made from 3 to 40 quarts, and the manufacturer claims for them the greatest possible economy of ice.

The Bailey Wringing Machine Co. illustrate, in their advertisement on another page, Simpson's Adjustable Vises, for which they are agents. These goods are made by the Athol Machine Co., and we are informed that they have met with such favor since their introduction on the first of this year, that the manufacturers are obliged to run their works night and day to catch up with orders.

A. C. Downing & Co., No. 57 Beekman street, have issued the following revised list for French Window Glass, under date of 1st inst.:

FRENCH WINDOW GLASS.

Prices current per box of 50 feet.

Single Thick.				
SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 12.....	\$ 7.50	\$ 6.75	\$ 6.25	\$ 5.75
11 x 14 to 16 x 24.....	8.50	7.75	7.25	6.50
18 x 22 to 24 x 30.....	9.75	9.00	8.50	7.75
24 x 36 to 30 x 42.....	12.25	10.75	10.00	9.25
30 x 42 to 36 x 48.....	14.00	12.50	11.75	11.00
36 x 48 to 42 x 54.....	16.00	14.50	13.75	13.00
42 x 54 to 48 x 60.....	18.00	16.50	15.75	15.00
48 x 60 to 54 x 66.....	20.00	18.50	17.75	17.00
54 x 66 to 60 x 72.....	22.00	20.50	19.75	19.00
60 x 72 to 66 x 78.....	24.00	22.50	21.75	21.00

DOUBLE THICK.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 12.....	\$12.00	\$11.00	\$10.00	\$ 9.25
11 x 14 to 16 x 24.....	13.75	12.50	11.75	10.50
18 x 22 to 24 x 30.....	15.75	14.50	13.75	12.50
24 x 36 to 30 x 42.....	19.75	17.25	16.50	15.25
30 x 42 to 36 x 48.....	21.00	18.50	17.75	16.50
36 x 48 to 42 x 54.....	25.00	22.50	21.75	20.50
42 x 54 to 48 x 60.....	28.00	25.50	24.75	23.50
48 x 60 to 54 x 66.....	32.00	29.50	28.75	27.50
54 x 66 to 60 x 72.....	36.00	33.50	32.75	31.50
60 x 72 to 66 x 78.....	40.00	37.50	36.75	35.50

Sizes above 60 x 80—100 per box extra for every five inches.

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 54 inches in length, and not making more than 81 united inches, will be charged in the 81 united inches bracket.

Discount 50¢ 5¢.

We hear of a better inquiry for Nails during the week, and some large orders have been placed. The stocks, as previously noticed, are light, and ascertainment in many cases badly broken. Although we quote Nails without change, it would be difficult to place quantity orders at current figures. We quote, as before, 10d., in lots of 200 kegs and over, \$2.75, net. Small lots, 5c. @ 10c. per keg advance, according to quantity and brand.

Through the courtesy of Wm. E. S. Baker, Secretary of the Duncannon Iron Co., of Philadelphia, we present the following "Nail Standard," which we think will be found useful to the Hardware trade. This Nail Standard is published by the above named Company in pamphlet form:

NAIL STANDARD.

All Chisel and Pressed Point Clinch Nails, Car, Slate and Barrel Nails made Edge Gripe.

Casing or Finishing, Floor and Box Nails made Flat Gripe.

Brads made with hook head, and are not gripped.

Ordinary Nails, Fencing and Spikes, made both Edge and Flat Gripe.

B. F. F. means Boston Fine Finish. W. means Western. C. S. H. means Countersunk Head. H. means Heavy. E. H. means Extra Heavy.

In arranging the following tables, the Plate used for ordinary Flat Gripe Nails is taken as the standard, and the thickness of each sized plate marked opposite the Nail for which it is used, in one-hundredth parts of an inch. In the column "Size of Plate," in other styles of Nails, the figures refer to the size of ordinary Flat Gripe Nails, which correspond to it.

Thickness of plate. This rule has been followed throughout, with the exception of 2d. Fine, 2d. and Fine 3d., ordinary Edge Gripe Nails, and 5½, 6, 6½, 7 and 7½ inch Flat, and Edge Gripe Spikes, which have no plate under the head of ordinary Flat Gripe Nails to correspond in size; the thickness of the plate is, therefore, given in one-hundredth parts of an inch.

Flat Gripe Nails.				
	Length.	Number to the Plate.	Number to the 100 sq. in.	Thickness.
3d.....	1½	400	100	.075
4d.....	2	300	75	.08
5d.....	2½	240	60	.10
6d.....	3	200	50	.11
7d.....	3½	180	45	.12
8d.....	4	160	40	.13
9d.....	4½	140	35	.14
10d.....	5	120	30	.15
11d.....	5½	100	25	.16
12d.....	6	90	22½	.17
13d.....	6½	80	20	.18
14d.....	7	70	17½	.19
15d.....	7½	60	15	.20
16d.....	8	50	12½	.21
17d.....	8½	40	10	.22
18d.....	9	30	7½	.23
19d.....	9½	20	5	.24
20d.....	10	10	2½	.25

Edge Gripe Nails.				
	Length.	Number to the Plate.	Number to the 100 sq. in.	Thickness.
2d.....	1½	400	100	.06
3d.....	2	300	75	.07
4d.....	2½	240	60	.08
5d.....	3	200	50	.09

glean from our French and German exchanges. The manufacturers of Lead are firm at the following quotations: Bar, 9c.; Sheet, 9½c., and Pipe, 10c.; discount to the trade, 10 per cent.

Spelter and Zinc.—As long as the brass manufacturers show little or no inclination to stock up with raw metals, Spelter will necessarily have to participate in the general dullness. While thus kept quiet, there are still outside parties who sell as low as 7½c., currency, against the combination price of 8c., currency, less one per cent. Of foreign there is none either available or aloft. The market in Europe is again giving signs of weakness. Sheet Zinc still lacks activity, and we quote the same—8½c. @ 88½c., gold.

Antimony.—Makers in England successfully uphold the high rates lately established, to which the market here has been slow to respond. We quote the article 16c. @ 16½c., gold, with but a moderate trade transacting therein.

OLD METALS, PAPER STOCK, &c.

The Old Metal market is still without any activity, and quotations remain about the same as last reported. The Rag and Paper Stock markets continue unchanged from the dullness previously noted. There is little demand for any description of stocks, and prices have a downward tendency. Dealers are unable to obtain more than 5½c. a pound for White Rags No. 1, that being the price which the mills are offering. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 10c.; Brass, 10c. @ 11c.; Composition, heavy, 12c. @ 13c.; Lead, solid, 5½c.; Tea Lead, 5c.; Zinc, 4½c. @ 4½c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5½c.; Gunny Bagging, 1½c.; Jute Butts, 1½c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Newspaper Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½c. @ 5c.; do. No. 2, 3c.; Tanned Shaking, 1c. @ 1½c.; Grass Rope, 2½c. @ 3c.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending May 9, 1876:

Hardware.	Perkins, Livingston, Post & Co.
Baldwin Bros.	Spiegel, tons, 40
Baker Hermann & Co.	Prosser Thos. & Sons,
Arms, ca, 11	Tubes, bbls., 33
Ironware, pags., 3	Probst F. & Co.
Cutlery, ca, 3	Boxes, 2
Packages, 2	Order.
Degraw, Aymar & Co.	Sheet, bxs., 33
Chains, 1	Packages, 356
Field Alfred & Co.	Rode, bbls., 23
Chains, ca, 3	Scrap, cks., 3
Friedrichs R. & Co.	Steel.
Ironware, ca, 6	Brown, Shipley & Co.
Mdse. pags., 1	Bars, 267
Friedmann & Lauterjung,	Bundles, 40
Mdse. pags., 3	Crocker Bros.
Fuller Bros.	Bessemer, tons, 140
Anvils, 25	Naylor & Co.
Ironware, ca, 1	Cases, 15
Henshaw T.	Bars, 11
Casks, 2	Prosser Thos. & Sons,
Cases, 4	Crank pin forgings,
Hutchinson J. M.	24
Packages, 7	Sanderson Geo. & Co.
Hillick A. H.	Bundles, 133
Laughland & Co.	Cases, 3
Wire, pags., 8 crates,	Seddon R.
4	Cases, 22
Moore's J. P. Sons,	Sulzbacher & Hyman,
Mdse. pags., 1	Cases, 22
McKinnis J. A.	Wolfe & Co.
Packages, 4	Packages, 356
Moys, Smith & Co.	Tyng & Co.
Cases, 2	Bars, 2
Quackenbush, Townsend	Order.
& Co.	Bars, 99
Packages, 1	Bundles, 191
Robbins & Co.	Crank pins, 20
Cases, 1	Cranks, 10
Sawyer John,	Cases, 4
Wire rope, coils, 1	Metals.
Swan & Brombacher,	Bruce & Cook,
Mdse. pags., 3	Tin plates, bxs., 1185
Schuyler, Hartley & Gra-	Byrne Joseph & Co.
ham	Tin plates, bxs., 525
Gunn, ca, 2	Cort N. L.
Sellars Abraham,	Tin plates, bxs., 1045
Cutlery, ca, 1	Darrell & Co.
Van Wart & McCoy,	Pieces, 1
Mdse. pags., 7	Copper, tes., 3
Cases, 4	Brass, tes., 3
Packages, 3	Naylor & Co.
Windmiller L. & Roelker	Tin plates, bxs., 845
Ironware, bxs., 1	Need, Sauril & Marne,
Order.	Tin sheets, ca, 4
Ironware, bbls., 3567	Phelps, Dodge & Co.
Casks, 2	Tin plates, bxs., 11-
Files, cks., 24	187
	Scheider J. & Co.
	Tin plates, bxs., 132
	Windmiller L. & Roelker
	Zinc, sheets, cks., 80
	Order.
	Tin plates, bxs., 8621
	Spelter, ingots, 1020
	Tin sheets, ca, 3
	Lead, pgs., 1704
	Tin andterne plates,
	bxs., 791

COAL.

Trade is as dull this week as it was last, and the signs of improvement are very small. Judging from the experience of past years, and the general state of trade throughout the country, we are led to think that dullness will characterize the Coal trade for a considerable time to come. The amount of Coal consumed is not large. There is no inducement whatever for the consumer to stock up. The combination prices are high, more coal is coming to tide water than can be disposed of, and outside coal is offered in such quantities and at such rates as to really control the market. Under these conditions it cannot be expected that there will be any improvement in the condition of affairs until the wants of the retail trade and of consumers become larger, and it is necessary for parties to put in their winter supply. Naturally, the quotations are those fixed by the combination, but it does not appear that sales can be effected at these prices, when Coal can be had practically at much lower figures. The great companies do not actually go below prices, so far as we can learn, but there are rumors of inducements of various kinds that

seem equivalent to a reduction. The stoppage of shipments over the Lehigh Valley road does not seem to have had any perceptible influence upon the market. The extremely dull state of the trade naturally influences freights, which are very low. Rates are unchanged, as will be seen by a glance at our table.

A goodly amount of Bituminous Coal is coming to market, the tables showing an increase of some 114,000 tons over last year. Most of the companies in the Cumberland region are at work. The Attorney General of Maryland seems to be pushing matters in the case between the coal companies and the railroad company. The case, we understand, will be up for argument on the 26th instant. This speed speaks well for the vigor of the case. We hope it will be quickly adjusted.

We quote as follows:

Cumberland, at Georgetown.....	\$5.25 @ \$5.75
West Virginia, at Baltimore.....	4.50 @ 6.00
Kittanning f. o. b., Baltimore.....	4.25 @ 4.35
Newburg Orel, at.....	4.50
Despard, at Baltimore.....	4.50
Broad Top, at South Amboy.....	4.75
Morrisdale, Wiggins.....	5.00
Canard.....	5.00
Consolidation Coal Co. f. o. b., George-	
town.....	3.65
Consolidation Coal Co. f. o. b., Balli-	
more.....	3.90
In barges at New York.....	5.50

WYOMING COALS.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chertnut.
Luckawna & Scrant'n at	4.65	4.75	4.85	4.95	5.55	4.75
Hoboken & Weehawken	4.50	4.60	4.70	4.80	5.40	4.60
Pittston at Newburg.....	4.65	4.75	4.85	4.95	5.55	4.75
Wilkesbarre at Port John-						
ston.....	4.65	4.75	4.85	4.95	5.55	4.75
Plymouth.....	4.65	4.75	4.85	4.95	5.55	4.75
Susquehanna Coal Co. at						
Amboy.....	4.65	4.75	4.85	4.95	5.55	4.75
Kingston at Hoboken.....	4.65	4.75	4.85	4.95	5.55	4.75
Black Diamond at Perth						
Amboy.....	4.65	4.75	4.85	4.95	5.55	4.75

LEHIGH COALS.

Old Company at Port	5.15	4.95	4.95	5.55	4.85
Johnston.....					
Old Company's Room					
Run at Port Johnston.....	5.15	4.95	4.95	5.55	4.85
Sugar Loaf, Hoboken and					
Amboy.....	5.15	4.95	4.95	5.55	4.85
Lehigh Coal Exchange at					
Port Johnston.....	5.15	4.95	4.95	5.55	4.85
Honey Brook Lehigh.....	5.15	4.95	4.95	5.55	4.85
Beaver Meadow at South					
Amboy.....	5.15	4.95	4.95	5.55	4.85

FREIGHTS—PER TON OF 2240 LBS.

	From Elizabethport, Port	From Hoboken & Weehawken.
From Philadelphia.		
From Baltimore.		
From Georgetown.		

PORTS.

	From Elizabethport, Port	From Hoboken & Weehawken.
From Philadelphia.		
From Baltimore.		
From Georgetown.		
Angusta, Me.....		
Albany.....		
Amesbury, Mass.....		
Bangor, Me.....		
Bath, Me.....		
Baltimore.....		
Boston, Mass.....		
Bridgeport, Ct.....		
Bristol, R. I.....		
Cambridge, Mass.....		
Derby.....		
Dighton.....		
East Cambridge.....		
Fall River.....		
Hackensack.....		
Hallowell, Me.....		
Hartford.....		
Hoboken.....		
Hudson.....		
Jersey City.....		
Lynn, Mass.....		
Middletown.....		
Mystic.....		
Newark.....		
New Bedford.....		
Newburyport.....		
New Haven.....		
New London.....		
Newport.....		
New York.....		
Norfolk.....		
Norwich.....		
Pawtucket.....		
Philadelphia.....		
Portland.....		
Portsmouth, N. H.....		
Providence.....		
Poughkeepsie, N. Y.....		
Rockport.....		
Saco.....		
Sag Harbor.....		
Salem, Mass.....		
Salisbury Pt., Mass.....		
Stamford.....		
Saybrook.....		
Stonington.....		
Taunton.....		
Troy.....		
Warren, R. I.....		
Wareham.....		
Weymouth.....		
Wilmington, N. C.....		

* 3c. per bridge extra. † And Sou Towing.

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, May 9, 1876.

Pig Iron.—The past week has been one of great dullness, and the depression seems to be more marked than for some time past, and although full rates are named as the nominal price, it is almost certain that good cash buyers could supply their wants at inside figures. We do not hear of any but small sales, and the market closes very quiet at the following quotations: No. 1 Foundry, \$22 to \$23; No. 2 Foundry, \$20.50 to \$21; Gray Forge, \$19.50 to \$22; and Mottled at \$18 to \$19.

Blooms.—We have no change of values to report, but the demand is light, as follows: Charcoal Scrap Blooms, \$47; Charcoal Ore Blooms, \$41 to \$42; Charcoal Billets, of superior quality, from \$60 to \$62; and Bars for converting into Steel, made of best Champlain Iron, \$75.

Bar Iron.—The demand during the week has been smaller than usual, and it seems as though the trade was about to suffer another relapse. It is thought, however, that the preparations for the opening of the Exposition are materially interfering with local trade, and after this week an improvement is looked for. The mills are all fairly employed, and prices are steady and firm. Sales of the week have been on the basis of 2.35c.

RAILS.—There have been a good many inquiries during the week for Rails, but we do not hear of any actual sales, and in the absence of transactions we continue our former quotations. We understand that the Texas Pacific

Railway Co. are in the market as buyers for 12,000 tons Iron Rails for immediate delivery, and in our next report we shall probably be able to report sales to that extent. Meantime we quote Steel Rails, at the seaboard, \$60 to \$62, with sales in some instances at a little higher prices. Iron Rails, \$40 to \$42.

OLD RAILS.—There is a firm feeling on the part of holders, and most of the stocks are held at very extreme prices. We do not hear of any large transactions during the week, and although a few small lots have changed hands at \$23 to \$23.50, holders generally ask \$24 to \$25. A fair quotation would be \$23 to \$24, as an average of the market.

SCRAP.—Trade is moderately active at our late quotations. Cast, \$16 to \$19, and Wrought, \$26 to \$29.

NAILS.—Prices are very firm, although the demand is only moderate. Sales are at \$2.75, in lots of 200 kegs and upward, with 10c. to 15c. additional for smaller quantities.

TIN PLATES.—A fair degree of activity prevails in the trade, and sales are at about the following rates: L. C., 10x14, \$8.50 to \$9; L. X., 10x14, \$10.25 to \$11; Best Charcoal, leaded, 28x30, \$16 to \$16.50; other good brands, \$15 to \$16; good fair, \$14 to \$14.50; Bright Tin, for cans, &c., \$7 to \$7.25; good Bright Tin, do., \$6.75 to \$7.25; Coke, leaded, 14x20, \$6.25 to \$7.

LEAD.—In the market abroad Pig seems to be dull and depressed, though 6½c. to 7c., gold, here is still demanded for Spanish. Domestic remains very quiet; small jobbing lots have been sold at 6½c., 6½c. to 6½c., gold.

SHOT.—The following are quotations of today, with 10 per cent. discount, cash in 30 days: Drop Shot in 25 lb. bags, 9½c.; in 5 lb. bags, 10½c.; Buckshot in 5 lb. bags, 10½c.; Bar Lead in 5 oz., ½ lb. and 1 lb. bars, 8½c.

OLD METALS.—The following are the current quotations to-day: Heavy Old Copper, 18c.; Light Tinned Copper, 16c.; Copper Bottoms, 14½c.; Heavy Red Brass, 14c.; Light Red Brass, 14c.; Heavy Yellow Brass, 13c.; Light Yellow Brass, 12c.; Heavy Clean Pipe Lead, 6c.; Junk Lead, 5½c.; Tea Lead, Light Paper, 6c.; Tea Lead, Heavy Paper, 5c.; New Zinc Clippings, 4½c.; Old Sheet Zinc, 4c.; Yellow Brass Turnings, 3c. to 10c.; Red Brass Turnings, 10c. to 12c.; Plumbers' Lead Joints, 6½c.

PITTSBURGH.

Pittsburgh, May 9, 1876.

Pig Iron.—While as a rule the inquiry is chiefly for small lots to supply immediate wants, there is a very fair business in the aggregate, and prices for good stock, both Mill and Foundry, are firm, with an advancing tendency. The stock of good standard Mill Irons is steadily being reduced, and with an average consumption and a light production the outlook is favorable for sellers. Some sales have been made within the past two weeks at an advance of 50c. per ton, and several lots are reported as having been withdrawn, the owners thereof refusing to accept current rates. It is also stated that the best Charcoal Foundry Irons are being held at an advance of \$1 to \$2 per ton, and as the supply of this character is light and growing less, the prospects are favorable for a higher range of prices. Common Irons, made from cheap ores, continue very dull; as good Irons are growing fewer the former appear to be getting weaker, as there is little or no demand for them. Standard Mill Irons are fairly quotable at \$22 to \$22.50, 4 mos.; and No. 1 Charcoal Foundry at \$28 to \$30, 4 mos.

NAILS.—The Nail market has not varied much since the date of last report. Business continues only fair, although about all that can be expected, in view of the recent advance, which is being rigidly and faithfully adhered to. We continue to quote at \$2.75, sixty days, for orders of 200 kegs and upward, \$2.85, sixty days, for less than 200 kegs.

HORSE SHOES.—Continue quiet and unchanged. Shoeborger & Co. quote Juniata at 4½c., cash; Mule Shoes, 5½c., cash.

STEEL.—The mills are all in operation, some of them working double turn, and the outlook is regarded favorable for a steady business all this year. Some of our manufacturers will make a very fine display at the Centennial.

COKE.—The market continues fairly active in view of so many pig Iron furnaces being out of blast, but complaint is made that prices afford little or no margin for profit; \$2.40 to \$2.50 per ton, delivered free on orders in Pittsburgh.

MANUFACTURED IRON.—The Western Iron Association had another meeting last week, and while there was no change made in the card, discounts were reduced equivalent to an advance. It was agreed that for small orders, less than 10 tons, full rates on a basis of 2½c., 60 days, for bars, should be adhered to; on orders of 10 tons or over, one-tenth off. It is understood that no action was taken in regard to the equalization of railroad freights, and it is not likely there will be. The meeting was largely attended, and there was a very general determination manifested to adhere faithfully to card rates. Now that the immediate future of the market is settled, so far as prices are concerned, it is expected that orders will commence to come forward more freely, as there is no reason why buyers should hold off any longer.

BOSTON.

May 6.—Pig has been very quiet. Buyers have very few wants, and they procrastinate applying these, anticipating a concession on the firmness established a week or so ago. In Foreign Pig there is not a ripple of inquiry. The stove men who usually about this time begin to canvass up their summer supplies take no interest in imported Iron at its quotations. American quotes a range of \$20 to \$26 for Gray Forge and No. 1. Bar is moving in a moderate way, with no special change in the tone, 2.3-10c. or \$51.50 being the current values to guarantee these rates, but they cannot be tracked to any reliable source by the closest canvassing. One or two mills have taken orders for common Iron, say two-thirds old Rails and one-third Scrap, at about \$49, delivered, and offered

all old rail stock at \$42. Possibly out of this have arisen the reports. Refined Bar Iron was sold, say a month ago, in this market at \$48, when quotations were \$49, and offers to sell at \$47.50 were named here at the time reported, but we think, if a buyer can secure the same Iron now at \$51 even there must be something unusual. We think the trade, without exception, will bear us out in the statement that our reports have followed the actual condition of the market very closely. Steel is quiet, prices are steady, receipts and stock moderate. We quote American Tool, 14c. to 15c.; American Machinery, 8½c. to 9½c.; Bessemer Tires, 5½c.; Sweet's Excelsior Tire, 7½c.; English Tool, 15½c., gold. Copper is easy at a loss of ¼c. to ½c. The receipts are larger, with the prospects of much larger to come, and at that upon a very small consumptive market. We quote 2½c. to 2½c. for futures and spots. For manufactured we quote: New Sheathing, 30c.; Bolts and Braziers, 31c.; Yellow Metal Bolts, 20c. to 22c. Lead is easy, and declines ¼c. for Pig. Receipts as yet are not very large. We quote Pig, 6½c. for Domestic and 7½c. for Foreign; Sheet, 10c.; Pipe, 1½c., currency; Tin Lined Pipe, 10½c.; Bar Lead, 9½c., less usual trade or 10 per cent. discount. Antimony continues in small request at 15½c., gold, firm. Spelter remains at 8c., currency, for both Foreign and Domestic, New York deliveries, Boston holders quoting \$8.05. Tin is in better demand, both for consumption and speculation, and the market stiffens at our outside quotations of a week ago. The London market still quotes \$72, with a strong feeling. We quote Straits, 17c.; Banca, 22c.; Refined English, 17c., gold. We quote Plates: Charcoal L. C., \$7.25; Coke, \$6.20 to \$6.50; and Terne at \$6.50 to \$7.50, gold.—Com. Bulletin.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of May 9: Trade the past week has ruled extremely quiet, with but little inquiry, and that to supply early and pressing wants, and transacted on basis of cost to both manufacturer and dealer.

AMERICAN REFINED BAR IRON.
1 to 6 wide by ¼ to 1 thick, 1 to 2 ½ to 4-10c. ½ lb. Round and square, ordinary sizes, from 1 to 2 inclusive..... 2 ½ to 2 4-10c. ½ lb. Hoop Iron, 1½ wide and upward..... 3 ½ to 4c. ½ lb. Band Iron, from 1½ to 4 in. wide..... 3 to 3 ½c. ½ lb. Horse Shoe Iron ¼ to 1 wide by ¾ to 1 thick..... 9 ½ to 4c. ½ lb. Norway Nail Rods..... 7 to 7 ½c. ½ lb. Black Diamond Cast Steel, Flats, Squares and Clutons, ordinary sizes..... 15 to 15 ½c. ½ lb. Machinery Steel..... 9 to 9 ½c. ½ lb. Homogeneous Steel Plate..... 9 ½ to 10c. ½ lb. Perkins' Horse Shoes, per keg of 100 lbs..... \$4.87 ½ lb. Nole Shoes..... \$4.87 ½ lb. Common Horse Nails, from 14c. to 18c. per pound.
Putnam Horse Nails..... 23 24 25 26 28c. per lb.
Globe Horse Nails..... 23 24 25 26 28c. per lb.
R. R. Spikes..... 23 24 25 26 28c. per lb.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of May 9: We have no change to note in the Iron market since our last. Prices remain unchanged, with considerable inquiry.

Baltimore Charcoal..... \$30.00 @ 35.00
Virginia..... 28.00 @ 34.00
Anthracite No. 1..... 23.00 @ 24.00
" No. 2..... 21.00 @ 22.00
" No. 3..... 20.00 @ 21.00
White and Mottled..... 17.00 @ 19.00

CINCINNATI.

Messrs. L. R. HULL & Co., under date of May 6, write us as follows: Pig IRON.—While sales have not been very active, there has been some improvement on previous week, and the tone of the market is believed to be better. Prices range about the same.

CHARCOAL.
Hanging Rock No. 1, 10 ton..... \$24.00 @ 25.00—4 mos.
" No. 2..... 23.00 @ 24.00—4 mos.
" No. 3..... 21.00 @ 22.00—4 mos.
Southern Brds No. 1..... 23.00 @ 24.00—4 mos.
" No. 2..... 21.00 @ 22.00—4 mos.
Virginia No. 1..... 23.00 @ 24.00—4 mos.
" No. 2..... 21.00 @ 22.00—4 mos.
" No. 3..... 20.00 @ 21.00—4 mos.
White and Mottled..... 17.00 @ 19.00

IRON COAL AND COKE.
Hanging Rock No. 1, 10 ton..... \$22.00 @ 23.00—4 mos.
" No. 2..... 21.00 @ 22.00—4 mos.
Red Short No. 1..... 20.00 @ 21.00—4 mos.
" No. 2..... 19.00 @ 20.00—4 mos.
Am. Scotch, No. 1..... 24.00 @ 25.00—4 mos.

COLD BLAST.

Hanging Rock Car Wheel 7 ½ in. \$40.00 @ 45.00—4 mos.
Missouri..... 30.00 @ 40.00—4 mos.
Southern Brds..... 30.00 @ 40.00—4 mos.
Machinery and Forge..... 30.00 @ 35.00—4 mos.
Blooms..... 30.00 @ 35.00—4 mos.

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 309 North Third street, St. Louis, under date of May 3, report the Iron market as follows: We note no change in our market since last report. Demand continues only fair, and prices very low. We hear of several large sales of No. 1 Foundry, but at very low figures. We quote same as last.

they, if we take a five or six week's leave of absence we could spend eighteen to twenty days on the forward and return voyages, and have ample opportunity, not only to look over the Centennial and its contents, but to run over to Niagara, and other show places before returning. I can assure you that I hear of many such trips being in contemplation, and that were it not for my business engagements I should certainly make the journey myself. We know here, and you hardly need reminding of the fact, that we look upon the United States as another England—as a country where almost every family here has one tie, or it may be many ties, of affection or blood. We are proud of America—from Canada, southwards—and we feel that in you there is the germ of the mightiest nation of the world. Setting aside what some people may be inclined to term patronizing sentimentality, we are very closely connected with you by strong trading ties, and we shall send you a few "head drummers" this summer with express orders to operate upon you in the most scientific manner with a view of extracting orders. Mr. Mark Firth, Mayor of Sheffield, and head of the great steel firm of Firth & Sons, leaves for America this week, and other well-known Sheffield gentlemen—manufacturers, clergymen, and others are making similar preparations. Mr. Firth, I hear, takes a splendid sample case with him—whatever his intentions therewith may be. If it were not for "that infernal tariff"—but no matter!

ANOTHER DYNAMITE CATASTROPHE.
It matters go on as they are doing for any length of time, we shall soon be relieved of our surplus population, and may thereafter be enabled to recommend Great Britain as a suitable field for immigrants. As a matter of fact, dynamite is altogether too irreplaceable to be long retained on our list of useful explosives. Gunpowder we can deal with, and feel comparatively safe, but no man within half a mile of a dynamite store, or even a single cartridge, can with confidence reckon upon continuing with him in his mortal coil. The latest case in point is furnished by an affair which took place early on Saturday morning, within a few miles of Neath, Glamorganshire, South Wales. At this place, called Cymer, a railway tunnel was being cut through a hard limestone rock, and both powder and dynamite were being made use of. There were three headings, each containing between thirty and forty men. It is said that one of the workmen incautiously struck a match wherewith to light his pipe, and that the explosion ensued therefrom. At all events, there was a most terrific explosion, the result being that fifteen men were blown to pieces and fifteen others very badly maimed. One poor boy was literally blown into shreds. Much of the rock was also shattered, and the work in hand was utterly destroyed. After this it is highly improbable that smoking will be in vogue with those who are seated on dynamite stores.

A SWIFT TROOP SHIP.
The British government is evidently not bent upon placing all its eggs in one basket, or, in other words, in relying solely upon huge ironclads. They are having a number of small, but swift, vessels built for the purpose of carrying dispatches, or annoying merchantmen, in case of war. Two of this class, the *Torquise* and the *Ruby*, with two gunboats, are being constructed by Earle's Shipbuilding Company, at Hull, the *Torquise* being now ready for launching. This vessel is 230 feet long between perpendiculars, and 40 feet 1 inch broad. She is built after the fashion of the American clippers, is divided into 30 water-tight compartments, and will carry 13 muzzle loading rifled 64 pounder guns on the upper deck, besides two smaller guns for boat service and torpedo firing apparatus. The poop and forecastle are deeply embraured, to admit of the bow and stern guns being fired fore and aft. Her engines are 2100 horse-power, and are on the horizontal, compound and return condensing principles. She will carry 220 men.

A BALLOON ACCIDENT.
Ballooning, as a science, may safely be said to be as yet in its infancy, despite the graphic illustrations of its development which have recently been set forth to an admiring world by Jules Verne. In fiction the balloon is a most convenient and clean way of getting desperate people out of still more desperate situations; but in reality it is occasionally no laughing matter to be suspended half-way between heaven—and earth. Last week, for instance, M. D'Artis, Ganfray and Pelletier made an ascent from Mans (France) about 4 o'clock on the Thursday afternoon. An hour after the balloon was seen from the village of Bonnetable to be careening about, apparently uncontrolled, at a slight distance from the ground. Inquiries being made, it was found that the three unfortunate men had been pitched out of the car, owing to the rough wind having blown the balloon into a grove of poplar trees. M. Pelletier is reported to be in a bad condition, whilst the other two gentlemen have escaped with a few broken limbs each. Enthusiastic young gentlemen who have perused M. Verne's capitulating "Five Weeks in a Balloon across Africa," would, I think, do well to bear in mind facts such as the above.

A STAFFORDSHIRE FAILURE.
On Friday a petition for liquidation was filed in the local bankruptcy court by Messrs. Knowles & Co., japanners and tin plate workers, of Wolverhampton. The liabilities are estimated to be about £12,000, with assets of considerable, but as yet not precisely ascertained value.

THE SCOTCH PIG IRON TRADE.
At Glasgow, as in all other districts, the iron trade remains in a very depressed condition, without animation being noticeable in any single direction. The shipments continue to be on a very limited scale, and makers' brands again show a slight decline in values. There are 62,534 tons in Connal's stores. Messrs. Wm. Colvin & Co. report a small business, and Messrs. James Watson & Co. (Glasgow, April 21st) say: "Our Scotch pig iron market has been quietly steady during the past week, warrants fluctuating between 58 1/4 and 58 1/2, cash, closing to-day buyers 58 3/4, sellers 58 1/4, cash. Shipments last week were 11,396 tons, against 14,583 tons in the corresponding week of 1875. We quote:

G. M. B., at Glasgow	No. 1.	No. 3.
Gartsherrie	59	58
Coltness	57	56
Summerlee	56	55
Langloan	56	55
Carnbroe	56	55
Calder, at Port Dundas	56	55
Glenarnock, at Ardrossan	56	55
Eglington	56	55
Dalmellington	56	55
Shotts, at Leith	56	55
Kinnell at Boness	56	55

Messrs. W. Colvin & Co. (Glasgow, April 25) say: "The warrant market was very quiet all last week, the price remaining between 58 1/4 and 58 1/2, and closing on Friday at 58 3/4. Yesterday there was no change in the quotations,

but to-day business was more freely done from 58 3/4 to 58 1/2, closing with buyers at the lower price, and sellers asking 58 1/2. The demand for shipping iron continues languid, and prices are all 6d. to 1/ per ton lower than last week, as under:

Deliverable alongside.	No. 1.	No. 3.
G. M. B., at Glasgow	59	58
Gartsherrie	57	56
Coltness	56	55
Summerlee	56	55
Langloan	56	55
Carnbroe	56	55
Monkland	56	55
Clyde	56	55
Goven, at Broomfield	56	55
Glenarnock, at Ardrossan	56	55
Eglington	56	55
Dalmellington	56	55
Carron, at Grangemouth	56	55
Carron, " specially selected	56	55
Shotts, at Leith	56	55
Kinnell, at Boness	56	55
Bar Iron	58	57
Nail Rods	59	58

SHIPMENTS.	Tons.
Week ending April 24, 1875	13,581
" April 24, 1876	9,490
Decrease	3,804
Total decrease for 1876	37,918

"IS THE CAUCASIAN PLAYED OUT?"

Who can say? Yet it does not look promising to find that the heathen—not Chinese, but Japanese—are actually sending us cargoes of building materials. Some time ago the Japanese government sent over a few young men to be educated in the manners and customs of the English. One of these young men found that the London builders were crying out for bricks and could not obtain them. He had heard that bricks were being exported from his native land to America, but had also heard that the import duties prevented the trade from being carried on largely. He noted these facts down and wrote off "home" advising the "old folks" to send their cargoes to England, where there would be no duty at all to pay. Accordingly, in due course (last week) a cargo arrived in London, and not only was it bought up, but large orders were at once given for future supplies. The Japanese bricks are said to be hard and of good quality. It is, nevertheless, somewhat strange that the domiciles of London and the far West should be constructed of bricks made in the far East, and that these latter can be shipped so great a distance and sold here at lower prices than our own productions.

TRADES OF SHEFFIELD.
No change has taken place locally during the past week, many of the works having been closed all the week, owing to the Easter holidays. There are now over 30,000 colliers out on strike in the district, and many of the iron workers are under notice. At John Brown & Co.'s and Charles Cammell & Co.'s, Sheffield, the bulk of the men are also out on strike against a reduction of wages of 10 to 15 per cent. The fact is, neither the iron nor coal masters care how long the men remain out, as by closing the pits and works they are limiting production, diminishing competition, and preventing prices from sinking to too low an ebb. In the cutlery branches trade is still very dull. The dispute in the scissors trade continues, but is of little consequence. In the cast steel trade I hear of one or two American orders being placed.

TRAFFICKING IN EXPLOSIVES.
Ever since the Bremerhaven affair the ship owners, both of this and other countries, have become suspiciously watchful over all sorts of packages, and have exercised all their ingenuity to prevent another villain from sending ships to the bottom by this means for the sake of gain. It is, in all senses, well that this should be so, inasmuch as the vessels might be lost by the inadvertence or carelessness of passengers, as well as by the plans of scheming over-sea-runners. One of the former class, by name Henry William Johnson, described as a merchant, was brought up at the Bow Street Police Court, London, last week, charged with an offense of this nature, to wit, the sending of certain dangerous materials on board the P. & O. vessel *Bokhara*, without distinctly intimating the nature of such materials. Johnson, it appears, had taken his passage from Venice to Bombay, but the company had refused to carry packages of photographic materials for him. He nevertheless sent some packages, which he charged became open en route, and were found to contain highly inflammable chemicals, such as collodion, ether, &c. The magistrates took a grave view of the case, and inflicted a fine of £80, in addition to ordering Johnson to find two securities for £50 each, and to enter into his own bond for £100 to appear when called upon.

"G. B. THORNEYCROFT & CO."
This well known and very old established firm has just been brought out as a "Limited" company, the partnership previously existing having been dissolved by effluxion of time, the senior partners being also retiring from business. The works comprise two blast furnaces, two finished iron works, iron mines and collieries, and the capital is fixed at the nominal sum of £200,000.

THE STAFFORDSHIRE IRON TRADE.
Like Mahomet's coffin, is in a state of suspension—if not, indeed, stagnation—consequent upon long continued suspension. There is next to no business doing, albeit some of the producers manifest a decided willingness to shade their quotations for all descriptions of finished iron. The arbitrator in the dispute between the iron masters and iron works of South Staffordshire has awarded a reduction of 7 1/2 per cent. The collieries of the same district have also received notice of a reduction of 6d. per day for "thick coal" men, and 3d. per day for those employed on thin seams. Some apprehension has arisen in this, as in other districts, owing to the clamor for protective duties now being raised by Germany and Austria, in consequence of which certain returns are now being made to the Foreign Office by the iron manufacturers of the country.

THE METAL MARKETS
continue very quiet, there being no reportable movement save a slight improvement in copper. Messrs. Von Daelzen & North, say: "Copper.—At the beginning of the week it transpired that smelters had taken their cargoes of Chili regulus at 10; also that about 2000 tons bars had changed hands in Liverpool from £78 to £78. 10/." This gave increased firmness to the market. G. O. B. for immediate delivery, have been sold to a small extent, at £79, whilst for forward delivery at fixed dates, and to arrive, they have been done at £78. 10/, and they are still obtainable thereat. Australian is dearer, and more inquired for. Bar sold at £83. 10/ to £84, and Wallaroo at £84 to £84. 10/; ingots, £85. 5/. Wallaroo has been rather irregular. Most smelters adhere to the late advance; others, however, have been selling cheaper, particularly manufactured, which was sold at £90, now £91 to £92, the price. We quote tough £85 and select £86. Tin has been dull and declining; sales of Straits made from £72 to £71, at which there are still sellers. Australian for the moment held off the market, consequently the small sales reported have been at comparatively firm prices, £71. 10/; the price is now nominally £73. In Holland, Banca nominal, 48 1/2 fl.; Billiton, 44 1/2 fl. English

quoted £77 for common ingots; £78, bars. Tin Plates.—Nothing to report; prices steady. Lead dull, at late rates; English, £21. 10/ to £21. 15/; Spanish, £21 to £21. 5/. Spelter without transactions; Silesian is quoted nominally £24. Quicksilver, £10. Antimony scarce, £85.

Latest Liverpool prices are:

Iron: f. o. b. in Liverpool, per ton.	£	s.	d.
Merchant bar	7	0	0
Merchant bar, in Wales	6	10	0
Staffordshire	7	15	0
Hoop	9	0	0
Sheet	10	15	0
Nail rod	8	0	0
Bar, best crown	7	15	0
Boiler plates	10	0	0

Tin Plates: f. o. b. in Liverpool, per box.	£	s.	d.
Charcoal, I. C.	1	5	0
Coke, I. C.	1	0	0

Copper: Delivered in Liverpool, per ton.	£	s.	d.
Bolt and Sheathing	7	0	0
Tile	90	0	0
Tough cake	90	0	0
Best selected	92	0	0

The Smyth Process for the Manufacture of Iron and Steel.

The London Mining Journal says: The present depressed state of the iron trade has led manufacturers to turn their serious attention to the question of lessening the cost of producing iron; and, among the most recent patents for that purpose, Mr. S. R. Smyth's, of Manchester, is, perhaps, the most remarkable. It is claimed that by the use of his new furnace the present crude and costly method of smelting iron ores is superseded, and the blast engine power dispensed with, the ores, &c., being reduced by a natural exhaust (as iron, in an ordinary air furnace), whereby a large amount of fuel is saved, as well as the cost of maintenance and repair of large and expensive plant, and it is estimated that a saving of at least 25 per cent. per ton may be secured in the first cost, as well as securing a higher class of iron. The "metal receiver" is a specially designed and novel vessel, capable of receiving direct and containing the whole charge or "tap" from a vacuum, blast, or other furnace, wherein the metal may be purified and refined to any extent desired, or converted into steel of any required quality; smaller quantities of iron or steel may, of course, be treated if necessary. A smaller receiver has also been designed for converting the higher qualities of steel, as they would be used in less masses. The purification and refining of metal in this receiver will be accomplished in from 15 to 30 minutes, at a cost not exceeding a few shillings per ton. It is suggested that the present process of refining is so wasteful that no adequate comparison can be made between it and the new process; but it is considered that the balance would be decidedly in favor of the vacuum principle.

In order that the invention may be of as extensive application as possible, the inventor states that the generator and its heater for gaseous compounds are specially designed for adaptation to existing steel works, by the use of which an inferior quality of iron may be used for the production of steel now made in Bessemer converters or Siemens furnaces, the oxidation of the metal by the present mode being neutralized by the introduction of reagents, thereby saving the immense waste of metal, and ensuring uniform quality. The heating and other furnaces may be heated either by the waste gases from the smelting or other furnaces, or by gas specially generated for use in the works, or by coal grates in the ordinary manner, and are constructed singly or in groups of six, arranged with fixed or with movable "trolley bottoms," into the latter of which the metal from the "metal receiver" is run—hydraulic apparatus being used to replace it in the furnace—and there worked into the condition of a "ball" by the aid of a "mechanical rattle," puddling being entirely unnecessary. Much fuel and manual labor are thus saved, and one of the most tedious and brutal processes of the iron trade dispensed with, one heat only being necessary. The productions from the patent processes are said to be purified, refined and carburized plate or pig iron, obtained direct from the ore by one melting; also cold blast iron and ordinary brands of pig iron. Wrought iron of any quality produced direct from the metal in large masses, without "piling" or welding. Steel of any quality, either hard or soft, and of any weight, produced in one heat from the ore, or from pig iron. Steel may be produced from any class of ore or pig without the use of spiegel.

With a view to carry out upon a large scale this invention, a company has been formed at Manchester—the Standard Iron and Steel Company—with a capital of £200,000. The works are of modern construction, and stand upon upward of ten acres of land, surrounded upon all sides by a substantial wall, and in direct communication with the Manchester, Sheffield and Lincolnshire Railway by two sidings into the works, and comprise two Bessemer converting pits with the necessary vessels, cupolas and hydraulic cranes and apparatus for handling large masses of metal, including a pair of powerful blowing engines, &c., a bar or rail rolling mill, and a plate mill, together with several large steam hammers, furnaces, &c., engineering and smiths' shops, store and pattern rooms, a well-arranged suite of offices and time-keeper's residence. By the acquisition of this property from Messrs. Bolckow, Vaughan & Co., with right of immediate possession, the company will be enabled to proceed with the adaptation of the works to the patented processes, and thus secure the means of bringing the patents into commercial use within a period not exceeding three or four months.

The Business Situation in England.

There are grave indications that British industry will find 1876 the worst year in its pres-

ent depression. The course of industry in that country has been slack since the great iron and coal expansion of 1871-2, but has still been moderately prosperous; that is to say, profits and wages were reduced, but could still be harvested and garnered off the business in less degree. There was still considerable annual increase to the national wealth and business; and, even for 1875, the internal revenue showed a considerable spring of elasticity over the amount of the previous year, which is always held to indicate some degree of prosperity. This year, however, the full force of the American revulsion is likely to be felt, just as we are beginning to recover from it. The capital which rushed into the iron and coal business at the time of high prices must now struggle with the old capital for a profit; and the labor which then got a triply increased wage now battles against a return to former terms. After all the concessions and arbitrations over successive reductions of wages, there is still an inadmissible difficulty, on account of which 15,000 coal miners are on a strike in the middle of the kingdom, and 10,000 iron laborers are unemployed in the northern districts. The "quarterly meetings" of the principal metal trades just held were peculiarly gloomy. Railroad earnings are also declining. Financially, millions of supposed value in the bonds of foreign nations have disappeared. On the Continent the outlook is scarcely more cheerful. The West Prussian Iron Works, at Elbing, which started with a capital of £107,000, and leaves debts to the amount of £75,000, has just been sold out at £70,000, or less than a fifth of the mortgages.—*Springfield Republican.*

Steel Rails.—Several facts of interest are to be found in the report of the directors of the Pennsylvania Railroad, which was recently published. During last year the Pennsylvania Railroad Company laid down 6895 tons of steel rails upon its main line, and the Harrisburg and Lancaster and other branches. A further quantity of 4372 tons of steel rails was laid on the New Jersey lines, while before the close of 1876 the double track of the New York division will be laid with steel, a similar improvement being contemplated on the Amboy and Belvidere Delaware divisions as renewals are required. One of the lines worked by the Pennsylvania and associated with it—the Philadelphia and Erie—also received steel rail renewals last year to the extent of 4173 tons. Steel rails are especially valuable upon American railroads, since, in many cases, they are hastily and imperfectly constructed in the first instance. Our railroad system has gradually built itself into solidity, efficiency and durability. In the first instance it has only possessed a road bed of the roughest and most elementary character. The railroad network system of the United Kingdom, also appears to be consolidating itself into the hands of a few great companies. This will add to the financial strength of our railroads, and enable them to carry out still further improvements. The use of steel rails, by diminishing the maintenance charges, has the tendency to increase the profits of our railroads, and this is a consideration which must tell in the future, as the larger the profits of the well established companies the more they will be encouraged to proceed with the extensions, for which there is abundant scope. The field which appears to be opening out for the railroad interest is practically boundless; the panic stopped progress which would otherwise have been made with the work of railroad development, but with the help of steel rails the railway companies are regaining something of their old prosperity, we may expect to see the work of construction resumed.

Two Great Explosions.

On Saturday evening last a magazine on Jersey City Heights, filled with "Red Rock" cartridges, used in blasting out the new tunnel of the Delaware, Lackawanna and Western Railroad, exploded, doing great damage to property, but without serious injury to person, so far as we can learn. The accident occasioned great consternation and alarm for many miles around the scene of the disaster. Several persons received slight wounds, but no one was near enough to the magazine at the time of the explosion to be seriously hurt. It is believed by the contractor and others that the magazine was blown up by strikers who were incensed against their former employer. Some property owners in the neighborhood disbelieve this, assert that the powder was in a dangerous condition, and declare that they will bring suits on account of their losses.

The force of the explosion seemed to spend itself in an east and west line. Directly east, at a distance of two miles from Bergen Hill, on West street, New York, and Christopher and Spring streets, window glass and sashes were blown out by the concussion, and a telegraph operator in the Western Union building is said to have been thrown from his chair. At the time of the explosion a car of the Union Hill horse railway line was on its way upon the elevator, five blocks distant. The horses and passengers were thrown down and the car glass shattered. Many houses on the heights over the tunnel were shaken into ruins, and some are so badly damaged that it will cost less to rebuild than to repair them.

The contractors affirm that the explosion resulted from spontaneous combustion. A former employe of the tunnel contractor said the cartridges to be safe must be kept damp, and if allowed to remain dry for two weeks would explode of themselves. He thought one cartridge had exploded from this cause and fired the remainder. The fact that 400 laborers in the tunnel had been on a strike, and had threatened the contractors, gave rise to the suspicion that one of them had caused the explosion. The statements of several policemen who had overheard the threats of the strikers, and

the actions of strikers after the explosion, strengthened this theory.

An accident very similar in character but, unhappily, more fatal, is reported in the London Times of April 25th, as follows: About half-past 8 on Friday night an explosion of dynamite in a new railway tunnel, which is being formed at Cymer, near Maesteg, resulted in the death of thirteen persons. The tunnel was to be about 1600 yards long. It was worked night and day, and at the time of the explosion the "night shift" men had been at work about two hours and a half. The inhabitants of the valley hearing a loud report from that direction, the village was instantly deserted, men, women and children making their way toward the tunnel. There was little to be seen but thick white smoke, with which the tunnel seemed to be filled. It was known that a number of men—about thirty—were inside, and it was supposed that all were killed. William Elliot rushed into the tunnel when the smoke had scarcely begun to clear away. He was inside only a few minutes when he was overcome by the fumes, and had to be carried out. He, however, retained consciousness long enough to see that dreadful work had been done. Before he had proceeded far he stumbled over the body of a man who, though prostrated, was not dead. It was while endeavoring to take this man to the mouth of the tunnel that he became insensible. Elliot also saw other bodies lying about. After he had been brought out, a party, headed by Major Beaumont, who happened to be staying in the neighborhood, and Mr. Hanson, Jr., the contractor for the section of the railway leading up to the tunnel, began the search for bodies and brought two men out alive. Then ten dead bodies were brought out rapidly and laid near the mouth of the tunnel on a heap of straw. Fifteen more were then brought out from the inner workings. There still remained two men and a boy, whose bodies the searchers could not find, although they worked until far into the night. The bodies were removed on planks to some empty huts at the bottom of the village.

Weldless Metal Tubes.

We have lately examined the details of a plan for producing weldless iron, steel or yellow metal tubes at a cheap rate, and by inexpensive machinery. The metal preferably used is a homogeneous steel from a Siemens-Martin or open hearth furnace. The first operation is the casting of a rectangular, hollow ingot, thicker when seen in section at the sides than at the ends. This ingot is then hammered to condense it. The opening, which is also rectangular, is then filled with a mandrel of the same material as the ingot. This mandrel is composed of several wedge shaped pieces, the number varying from two to five, according to circumstances. Both mandrel and ingot are then drawn down by rolling and cross rolling until the metal is reduced approximately to the proper thickness of the tube. The edges, however, are cut off so as to have the thickness of metal around the mandrel the same at all points. At this stage the plate has about the same dimensions that the finished tube would have if flattened out to the same thickness. By driving a tool into the mandrel its parts are separated until the end of the sheet is spread so as to take an oval form. It is then edge rolled, and, owing to the wedge shape form of the pieces composing the mandrel, the tube is opened by the rolls and brought by them into a circular shape. It is then rolled over a knob in the same way that welded iron tubes are made. This finishes the operation, unless it is desired to cold roll for the purpose of making shafting, or to draw through dies to give a polished surface to the outside. The process is a very simple one, consisting, it will be seen, of rolling and hammering. In a great many of our mills but very little extra plant would be required to make such tubing. The manufacture would be well suited to a rail mill.

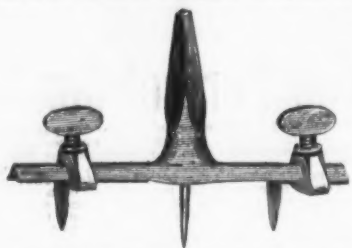
The mandrel is of the same material as the tube, or of one that draws down at the same rate. It is prevented from sticking by luting it with graphite or some similar substance. After it has been drawn down, the pieces which are of the same length as the tube and quite small, are returned to the furnace to be melted over. The metal is all handled hot the same as in ordinary rolling. Tubes of this character can be made of any size and thickness with very little trouble and a very light plant, and they can be turned out by the ton instead of the hundred weight as at the present, while the cost of manufacture is very light. Some time since we saw some specimens of tubes made by this process; they were exceedingly fine, without seam or flaw, and seemed more like rods bored out than iron or steel tubes as we ordinarily see them.

Tin Plates Cut to Pattern.—In our issue of the 4th instant, reference was made to the waste involved in cutting square plates to shape. The following, which we extract from a Philadelphia contemporary, shows that this difficulty is met by the N. & G. Taylor Co., of that city, whose advertisement will be found on another page:

THE TIN PLATE DISPLAY.—The metal and metal manufacturing interests in the Exhibition make a display of very general interest. The only exhibition of tin plate in the United States section is N. & G. Taylor Co., of this city, importers and manufacturers of this material. Their large and conspicuous display in the Main Building is now fully in position, and consists chiefly of a complete exposition of their patent pattern sheets. These plates are manufactured through an exclusively controlled process, the invention of N. & G. Taylor Co., and covered by United States and British patents. The merit lies in having the plates furnished to consumers cut to the exact shape required by the article to be manufactured. These shapes are made in every variety from the iron, "before tinning," and are then coated with the metal, the best materials only are used, and a clearly established saving of waste, and, consequently, of price to the buyers of 25 to 30 per cent. is the result. The works of the firm are in full operation, and this branch of their trade is in a state of rapid development. Another feature of their exhibit is that shown by the contrasted sizes of the plates from its early dimensions of 9 1/2 x 13 1/2 inches, a size long in common use, and the huge plates 144 inches by 40 now successfully made and largely used.

Improved Washer Cutter.

The above cut represents an improved Washer Cutter for cutting washers or circles from leather, rubber, paper or other material, for use on wagon axles, joints, steam and water pipes and various other purposes. It consists of a T shaped holder, the upper end of which may be held in an ordinary bit stock. The lower side has a triangular groove in it and a steel point in the center, on which it revolves. The cutters are made of triangular steel, and fit in



the groove in the holder, being held in place by an iron strap and set screw. The cutters are held with great firmness, and with very slight strain on the screws, owing to the shape and length of bearing which they have in the groove. This tool was patented in February, 1875, and is being manufactured and sold by Goodnow & Wightman, Boston, Mass. See advertisement on page 36.

Old Business Houses in Europe.

In England and on the Continent of Europe there are mercantile and banking houses in active operation to-day which celebrated their centennial festivals long before the foundations of the American Union were laid. Only the other day, and as a consequence of the frantic and dishonest speculations engendered in Germany by the sudden flow into that country of the French milliards, a banking house suspended payments in Lubeck which had done business in that picturesque old Hanse town for more than 300 years under the same firm name. This is believed to have been the very oldest business house in Europe. But there are firms in Amsterdam and in Bordeaux of an antiquity hardly less imposing.

The publishing house of Firmin-Didot, in Paris, as all the world knows, has been notable among men from the early years of the eighteenth century; and there are hotels in France, as well as in Germany, which have been kept up and have prospered under one name from the time of the Thirty Years' war. Over the door-way, indeed, of one such inn—the Maison Rouge—at Reims, an inscription reads that within its walls the father and mother of the Maid of Orleans found shelter and good fare, with the heroic Maid herself, during the triumphant coronation of Charles V. of France. The most striking instance of commercial longevity in England, perhaps, is that of the famous banking house of Childs, at Temple Bar Within, the books and papers of which filled up for many years the muniment rooms of Temple Bar itself.

Among these records are to be found such papers as the accounts of Alderman Blackwell, then a member of the firm, for the sale of Dunkirk to the French for 6,000,000 of livres, by that "marry monarch," Charles II., in 1662, only four years after it had been hardly won from the Spaniards by the "Ironside" and iron will of Cromwell. "Francis Child at the Marygold in Fleet street, goldsmith," kept a "running cash" throughout the reign of Charles II., and founded the house. The Marygold is still its sign, and though the chief proprietor now wears the coronet of a British earl, the old firm name and symbol are still its proudest distinctions. In most of these cases, it is true, the perpetuity of a business enterprise has been linked with that of a particular family; but this is by no means an essential conjunction.

Special Notices.

Wanted.—A Partner

In a well established business (8 years) in a Western city. "Jobbing and Retail" in Machinery, Railroad, Mill, Steam and Gas Fitters' Supplies. Steam Heating one of the leading branches, and paying; amount of business annually over \$100,000. Want to extend business and increase the present capital \$20,000. None but first-class business men with experience, energy and capital need apply. Give references. Address **MACHINERY**, Office of *The Iron Age*, 10 Warren St., N. Y.

VENTILATING & STEAM HEATING.
A thoroughly competent engineer, with extensive experience in the above line, desires employment. Address **M.**, Office of *The Iron Age*, 10 Warren St., N. Y.

Wanted,

A Foreman who has had practical experience in the construction of Architectural Iron Work; must understand draughting and figuring quantities. A permanent situation for a good steady man. Address **H. W. BELDIN**, 195 Reed St., Milwaukee, Wis., giving terms and references.

Wanted.

The co-operation of a party having an Iron Rail Mill, to organize the manufacture of Hydraulic Tubing and Hollow Shafting by a method not heretofore in use, which will materially reduce the cost of production and furnish a better article than has ever been made. Address **TUBE**, Office of *The Iron Age*, 10 Warren St., N. Y.

Wanted.

A young man with business experience and good qualifications desires an engagement as clerk or assistant in some business, with a view to purchasing an interest in six or twelve months if everything is satisfactory. Would prefer a small manufacturing business or manufacturers' agency, in which a small capital could be invested with advantage. New York or vicinity preferred. Address **G. E.**, Office of *The Iron Age*, No. 10 Warren St., N. Y.

Special Notices.

Bargains in Machinery.

We offer the following for sale, the new machines being marked N., all others being second-hand.

MACHINE TOOLS.

Planer, 16 ft. x 42 in. sq., \$1525; 16 ft. x 31 in., \$800; 11 ft. x 30 in., \$500; 8 ft. x 26 in., N., \$700; 3 ft. x 15 in., \$240; 2 ft. x 14 in. x 16 in., \$300; 4 ft. x 14 in., \$190; Putnam 24 in. Gear Cutter, \$500; Combined Gear Cutter and Miller, 24 in., N., \$450; Milling Machine, N., \$387; 52 in. Warner & Whitney Vertical Drill, \$350; 56 in. Moore & Wynne Vertical Drill, \$350; Upright Spindle, \$90; Heavy double Press, \$200; Tuff Press, \$145; 8 ft. x 44 in. Chucking Lathe, with Slide Rest, \$225; No. 2 Merriman Bolt Cutter and Nut Tapper, capacity 1½ in., \$175; Round Portable Forge, \$20; Back-gear, Screw-cutting Engine Lathes, complete, 60 in. swing, turning 7 ft. between centers, N., \$2300; 25½ ft. x 36 in., N., \$1550; 20 ft. x 24 in., N., \$600; 16 ft. x 21 in., \$650; 16 ft. x 31 in. (with chuck), \$600; 12½ ft. x 20 in., \$500; 15 ft. x 20 in., \$400; 12 ft. x 24 in., \$425; 8 ft. x 20 in., \$240; 6 ft. x 15 in., \$330; 6 ft. x 17 in., \$225; 6 ft. x 18 in., \$217; 6½ ft. x 15 in., \$165; 5 ft. x 16 in., \$175; 5 ft. x 14 in., \$195; 5 ft. x 15 in., \$210; Not screw-cutting, 16 ft. x 24 in., \$240; 15 ft. x 20 in., \$350; 16 ft. x 20 in., double headed, \$250; 11 ft. x 12 in., double headed, \$155; 8 ft. x 17 in., \$215; 5 ft. x 18 in., \$95; 4 ft. x 19 in., \$150. Speed or Drill Lathes: 5-6 ft. x 12 in., N., \$75 each; 6 ft. x 13 in., \$50; 5 ft. x 13 in., \$75; 3 ft. x 18 in., \$35; 2 ft. x 20 in., \$25; One Japanning Oven, 32x20x27, \$20; 15 in. 3 jawed Westcott, N., chuck, \$50; 12 in. 3 jawed Westcott, N., chuck, \$42.

PORTABLE AND STATIONARY ENGINES AND BOILERS.

80 h. stationary, horizontal, cylinder, 14x18, \$1600; 75 h. p. sta. hor. Engine, 16x20, \$800; 60 h. p. sta. hor. Engine, 14x20, \$1000; 80 h. p. hor. Boiler, \$1000; 60 h. p. hor. Boiler, \$500; 2-60 h. p. Locomotive Fire Box Boilers, each \$450; 4-50 h. p. Locomotive Fire Box Boilers, each \$400; Upright, 50 h. p. Chubbuck Engine, 2-9x18 cylinders, \$1050; 45 h. p. hor. Boiler, \$700; 2-60 h. p. 2 fine Boilers, 31 ft. long, each \$435; 40 h. p. hor. Engine, 12 ft. x 24, \$740; 40 h. p. upright Engine, 12x24, \$700; 35 h. p. Portable Engine, 12x18, \$1250; 35 h. p. sta. hor. Engine, 12x24, \$625; 30 h. p. Portable Engine, 12x18, \$1270; 3-25 h. p. Portable Engines, \$1300, \$1450 and \$875; 25 h. p. sta. Engine and 30 h. p. upright Boiler, \$850; 2-25 h. p. Portable Engines, \$950 and \$820; 25 h. p. sta. hor. Engine, \$235, \$340; 25 h. p. sta. Engine and 30 h. p. upright Boiler, \$1100; 2-20 h. p. upright Boilers, \$300 and \$225; 2-18 h. p. Portable Engines, \$925 and \$900; 15 h. p. sta. hor. Engine, 9x11, \$350; 16 h. p. hor. Boiler, \$1200; 12 h. p. Portable Engine and 16 h. p. Boiler, \$550; 12 h. p. sta. hor. Engine, 7½x14, \$200; 12 h. p. Portable Engine, \$440; 10 h. p. upright Boiler, \$176; 8 h. p. Portable Engine, trucks and all attachments for threshing, \$550; 8 h. p. sta. Engine and upright Boiler, \$480; 7 h. p. Hor. Air or Caloric Engine, \$640; 7 h. p. Portable Engine, with hoisting attachment, \$450; 6 h. p. Portable Engine, \$460; 6 h. p. hor. Engine, 5½x10, \$160; 5 h. p. upright Engine and Boiler, with lat shafting, etc., \$430; 5 h. p. Portable Engine and wood-sawing apparatus, \$305; 5 h. p. Root Sectional Safety Boiler, \$75; 3 h. p. Roper or Hot Air Engine, \$225; 1½ h. p. Portable Engine, N., \$185; 2½ h. p. sta. hor. Engine and Boiler, \$300; 2½ h. p. sta. hor. Boiler, \$70; 18 in. Steam Whistle, N., \$75 (can be heard 30 miles); 12 in. Steam Whistle, \$30; 8 in. Steam Whistle, \$20.

PORTABLE ENGINES AND CIRCULAR SAW MILLS.

35 h. p. Portable Engine, 48 ft. Circular Saw Mill, Set works, 140 ft. heavy drive belt, two large saws, shafting, pulleys, hangers, etc., \$2150; 18 h. p. Portable Engine, 37 ft. Circular Saw Mill, Set Works, 2 large saws, small saws and arbors, all belting, etc., all \$1650.

CIRCULAR SAWS.

60 in. 6 and 9 gauge, Dieston Saw, \$110; 49 in. Inset Inserted Tooth Saw, \$70; 48 in. Emerson Hinged Tooth Saw, \$50; 2-46 in. 6 and 7 gauge Saws, each \$35; 1-44 in. Saw, \$25; 1-32 in. 6 and 7 gauge Saw, \$40.

SAW MILL AND WOOD-WORKING MACHINERY.

30 ft. Circular Saw Mill, set works, saw, belting, etc., \$375; 28 ft. Circular Saw Mill, set works, saw, belting, etc., \$350; 2 Patent Set Works, N., each \$80; Up and Down Saw Mill, 35 ft., and two 34 inch water wheels, \$300; 12 ft. 2 in. Logging Chain, 25 lb., 2 par. Car Wheels, \$17; 2 Screw Head Blocks, \$16 each; Brown Frost Log Dog, \$22; 4 Shingle Mills and Jointers, \$200, \$155, \$80, and \$60; Gang Lathe Sawing Machine, \$185; 4 Bobbin Lathes, \$60 each; Baldwin Wood Lathe, hollow auger style, \$175; 30 in. Rotary Bed Planer, \$200; 26 in. Rotary Bed Planer, \$240; 24 in. Rotary Bed Planer, N., \$190; 26 in. Rotary Bed Planer, N., \$225; No. 3, Woodworth Planer and Matcher, Ball's, N., \$1000; No. 6 Woodworth Planer and Matcher, Ball's, N., \$750; 24 in. Woodworth Planer, Ball's, N., \$545; 24 in. E. J. Planer and Matcher, Ball's, N., \$400; 4 Roll Planer, \$400; Cylinder Planer, \$140; 16 in. Woodworth Planer, \$90; 24 in. Woodworth Planer, \$60; 14 in. Power Matcher, N., \$250; 14 in. Power Matcher, \$150; Gray & Woodson Combination Planer, Wood's 12 ft. x 24 in., \$390; Daniels' Planer, 41 ft. x 24 in., \$175; Daniels' Planer, 8 ft. x 24 in., \$150; No. 1½ Davis Dovetailer, \$180; 8 in. Buzz Planer, \$75; Andrews Box Board Sawing Machine, 48 in. slide, \$250; Box Board Matcher, N., \$65; Stave Sawing and Planing Machine, Equalizing Saw, Stave Jointers, Close Heaters, Windlasses, Trussing Machines, Barrel Lathes, Heading Machine, Cooperage, Tools, etc., for sale or barter on application. Cylinder Stave Saw, \$110; 120; Cylinder Kit Stave Saw Machine, \$115, N., \$75; Axe Handle and Spoke Turning Lathe, \$140; Wheeler & Mellick Endless Tread Hb Power, with wood-sawing rig, \$165; Capstan Horse Power, one or two horses, \$25; 3 Side Monitor Molder, Ball's, N., \$25; No. 1, Lee 4 Side Molder, \$40; No. 2, Lee 4 Side Molder, \$35; No. 2 Rogers 3 Side Molder, \$32; Large 4 Sides, Iron Frame Molder, Ball's, N., \$300; small size Iron Frame Molder, 4 Sides, Ball's, N., \$208; Sash Molder, \$80; Sash and Blind Sucker, \$115; No. 2 Smith Mortiser, \$135; Foot Mortiser, \$15; No. 2 Smith Tenoner, \$115; No. 3, R. M. & Co. Tenoner, \$140; Wood Frame Tenoner, \$80 and \$60; Ball Blind Stile Tenoner, N., \$80; Blind Slat Crimpers, N., \$50 and \$75; Ball Boring Machine, N., \$50; Smith Blind Stile Borer, \$60; new Band Saw Mach. in. iron frame, \$150; almost new Iron Frame Band Saw, \$125; Scroll Saw, N., \$60; Moore's Scroll Saw, \$50; Jig Saw, \$30; Irregular or Variety Molders, \$10 and \$160; Iron Frame Railway Cut-off Saw, N., \$24; Hand saw Machine, boring, planing, scroll and circular sawing, N., \$140; 24 in. Wood Lathe, N., \$90; 30 in. Wood Lathe, \$87; Wood Lathe, \$45; Strutching Machine, and chucks, \$15; No. 3 Dowel Machine, N., \$41; Dowel Machine, \$10; No. 3 Hand Boring Machine, \$6 each; Boring Shaft and Bits, N., \$16; Knife Grinding Machine, N., \$16; Emery Arbor and Stand, \$30; Emery Arbor (double) stand and counter, \$30; 6 new Steel Saw Arbors, each, \$12.

LOT SHOE PEG MACHINERY.

Sawing and Heading Machine, 36 in. saw, \$135; Boring Lathe, \$35; Bleaching Furnace and Fan, 18 in. \$35; New Steam Dyer and Fixtures, \$375; Screens, \$37.

COTTON & WOOLLEN MACHINERY.

6 Finisher Cards, with rub roll, feed aprons, workers, and strippers, each, \$150; No. 1 Card, \$125; No. 2 Card, \$100; No. 3 Card, \$75; Picker, \$25; Cloth Shears, \$35; Press Paper, Press Plates and Press Screw, \$43; new Cloth Sewing Machine, \$50; 3 Pepper Leggers, each, \$125; 3 Aiken Leggers, each, \$125; 4 Footers, each, \$75; 13 Manhattan Sewing Machines, each, \$25.

BLOWERS AND FANS.

No. 7 Sturtevant Blower and Hot Blast Apparatus, \$425.

FIRE ENGINES, STEAM PUMPS, etc.

First-class Amoskeag Steam Fire Engine, Rotary Pump, \$1340; 2nd order, \$1340; No. 7 Sutherland Steam Pump, \$180; No. 4 Gould & Garrison Fly Wheel

Steam Pump, \$275; size B, Blake Pump, \$230; No. 5 Knowles Pump, \$200; No. 4 Knowles Pump, \$175; No. 3 Knowles Pump, N., \$165; No. 3 Wright Pump, N., \$155; No. 2 Knowles Pump, \$150; No. 1 Knowles Pump, \$95; No. 0 Wright Pump, N., \$85; No. 1, Selden Pump, \$80; almost new Steam Derrick, 65 ft. mast, 52 ft. boom, \$600; 425 gallon Copper Kettle, \$300.

IRON PULLEYS.

bored, turned, set, screwed, and balanced 9 ft. x 30 in. 5c. lb.; 6½ ft. x 20 in. 4c. lb.; 5 ft. x 25 in. 3½ c. lb.; 5 ft. x 12 in. 5c. lb.; 4 ft. x 10 in. 4c. lb.; 3½ ft. x 22½ in. 5c. lb.; also, 250 ft. 4 in. cast iron pipe, 3c. lb.

WATER WHEELS.

complete with shafting, couplings, gears, boxes, etc., 5 ft. Blake Wheel, \$275; 5 ft. Whitney Wheel, \$250; 4 ft. Blake Wheel, \$195; 3 ft. Whitney Wheel, \$275; Cottrell & Babcock Water Wheel Regulator, good as new, \$75.

GRIST MILLS.

Platt 36 in. Portable Grist Mill, \$195; Platt Portable Grist Mill, 30 in., \$185; both Pulley Mills. Send stamp for our printed list. No. 5, fully describing the above machines and many others, stating just what you want and where you saw this.

S. C. FORSAITH & CO.,

Machinery and General Machine Dealers,
Manchester, N. H.

NOTICE TO Centennial Exhibitors.

I am now manufacturing for the use of Exhibitors at the Centennial, one of the most unique business cards that could be presented to a visitor.

On one side is a mirror, on the back is where your name and address are stamped in gilt. It is round in form, about the size of a Silver Half Dollar, INDESTRUCTIBLE. It will be prized by those who receive one, and not laid aside as paper business cards are. Prices for quantities furnished by

W. F. HYATT,

Successor to HICKOX MFG. CO.,
250 Pearl Street, NEW YORK.

WANTED situation as foreman in a mechanical establishment, by a man 28 years of age. Is a college graduate, has served a three years' apprenticeship at machinists' trade, and for past two years has been assistant draughtsman in water works construction. References as to ability and character. Address, **F. M. C.**, P. O. Box 208, Rochester, N. Y.

Plummer Scroll Sawing Machine.

For Amateurs, Artisans, &c.
Simple, strong and durable. Is adapted for general light wood scroll and fret sawing, also for saving thin metals and other hard substances. See *The Iron Age* of April 19th, No. 15, page 8, for description and cut. Parties wishing to lease American or foreign patents or royalty or to purchase the same will please communicate with

J. H. PLUMMER,
1276 Pacific St., Brooklyn, N. Y.

CENTENNIAL EXHIBITION.

A young man, a native of this city, with good references, having had large experience in the Hardware Trade, offers his services in receiving, arranging and keeping goods in order during the exhibition. Terms moderate. Address,

JOSEPH K. PARKER,
461 North 2nd Street, Philadelphia.

A. PURVES & SON,

Corner South & Penn Streets, Phila.,
Dealers in
Scrap Iron & Metals, Machinery, Tools,
Shafting & Pulleys, Steam Engines,
Pumps & Boilers, Copper, Brass,
Tin, Rabbit Metals, Foundry
Facings. Best Quality Ingot Brass.
Cash paid for all kinds of Metals and Tools.

HALL & HARBESON,

Manufacturers of
Chemical & Physical Instruments,
191 Greenwich Street, N. Y.
SPECIALTY.—BUNSEN'S GAS BURNERS, for all heating purposes; BENSON'S IMPROVED GAS CONSUMERS' FURNACES, with 10, 15 and 25 burners. Fine Brass and Metal Work made to order for Metallurgists, Chemists, Experimenters, Colleges, &c.

HARDWARE SPECIALTIES

Manufactured to order on favorable terms.
POWER AND ROOM to Rent by the
CORRUGATED METAL CO., East Berlin, Ct.

JUST ISSUED.

EVERYTHING
FOR THE
FARM.
Seeds, Implements, Machinery, and Fertilizers.
New Catalogue, 300 Ill. Illustrations, mailed on receipt 10 ct. stamp.

A. B. COHU,
197 WATER ST., N. Y.

Wanted.

some manufacturer to buy the patent of the
IMPROVED SMOOTHING IRON
described and illustrated in the January 1, 1876, issue of the *Scientific American*, in the whole or in parts. Address

R. H. HASENRLTER, Herman, Mo.

Partner Wanted,

In large Iron Property. Charcoal Furnace and Forge Works leased for \$12,000 per annum, quarterly payments. Room for other works. Make best quality metal. Address
F. O. Box 863, Baltimore, Md.

Important to Manufacturers.

BISSELL, WELLES & MILLET,
Auctioneers and Commission Merchants, No. 15 Murray St., New York.
Solicit from Manufacturers and others consignments of Hardware and Cutlery for our weekly Auction Sales to the Trade, or at private sale for cash, as desired. Our facilities for moving large lines of goods are unsurpassed. Advances made if desired.

TO MANUFACTURERS.

For Sale or Rent on favorable terms, **THE WYANDOTTIC AGRICULTURAL AND SOY BEAN WORKS**, located on the Detroit River, (10 miles south of the city of Detroit) in the city of Wyandotte, Mich., consisting of block of ground, extensive buildings, together with engine, shafting, machinery, cupola, tools, patterns, flasks, &c., &c., all in good condition. A daily line of steamers during navigation, and two competing lines of railroad, making cheap transportation to any point; the immediate proximity to the Wyandotte Rolling Mills (only a few hundred feet) for bar or plate iron of superior quality, and two blast furnaces which manufacture the best of Lake Superior Pig Iron. Surrounded by a good farming country, with plenty of hard wood timber at low price, renders it one of the most desirable locations in the country for a live manufacturing enterprise. For particulars, address,
Dr. E. P. CHRISTIAN, Trustee,
Wyandotte, Mich.

Special Notices.

SPECIAL NOTICE.

Having established ourselves in business in this city for the sale of

American Hardware, House Furnishing Goods, Agricultural Implements, etc.,
we beg to solicit correspondence with parties desirous of being represented by us in Germany and surrounding countries.

HAMMACHER & DELIUS.

HAMBURG, Germany, April, 1876.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,
IRON AND STEEL,
Care of P. O. Box 813, Bridgeport, Conn.

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings

in quantities to order at reasonable rates.

HERMANN BOKER & CO., Proprietors,
101 & 103 Duane St., N. Y.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dates as follows: Dec. 19, 1860; January 31, 1862; July 3, 1866. There is a special claim on each of the Dies. All persons infringing on said patents will be held responsible to the extent of the law. **Russell Jennings.**
DEEP RIVER, Conn., Sept. 7, 1874.

TO LET,

A Light, Handsome Office.

Possession Immediately.

HERMANN BOKER & CO.,
101 Duane Street, N. Y.

MANUFACTURERS

desirous of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper "IRON," published every Saturday, at 99 Cannon Street, London, E. C.

SCALE: First 3 lines, 3s.; every additional line, 10d. Price, 6d. per copy, or 30s. per annum, inclusive of postage to the United States.

Steel Castings.

Solid and Homogeneous. Guaranteed tensile strength, 25 tons to square inch. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price list to
CHESTER STEEL CASTINGS CO.,
Evelina St., Philadelphia, Pa.

Hardware Business For Sale.

One of two stores, one at Watertown, Mass., in care of my son, one in the city of Newton, Mass. Either store is well established and remarkably well situated for trade, having been established some 18 or 20 years, and under my own care. The growth of this trade is sufficient recommendation for any party wishing to establish themselves in trade. Apply to
Alfred Howes, Newton, Mass.
Or, **George E. Howes, Watertown, Mass.**

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy.

A practical man with means is wanted to join a practical man who is already well established.

Address **CAR WHEEL FOUNDRY,**
P. O. Box 134, Selma, Alabama.

Briesen's Patent Agency

FOR SECURING INVENTIONS, TRADE MARKS, &c., IN AMERICA AND EUROPE.
No. 258 Broadway, New York.
A. V. BRIESEN.

NOTICE! POND'S TOOLS.

The undersigned has assumed the Personal Property, including accounts, finished and unfinished Machinery, good will &c., connected with the manufacture of **MACHINIST'S TOOLS** as conducted by Mr. Lucius W. Pond since 1847, and will continue the said business at the old stand, cor. Union and Exchange Sts., Worcester, Mass., under the name of **DAVID W. POND, Successor to Lucius W. Pond.**

CARD.—Having assumed the business mentioned above, I solicit inquiry and patronage, with guarantee that present standard of Workmanship and quality of Machinery shall be maintained. A large quantity of New and Second-Hand TOOLS, ALL STYLES AND SIZES, For Sale at Low Prices. Send for list of second-hand tools. Store at 98 Liberty St., New York, will be discontinued from Feb. 1, 1876, and all sales made from manufactory.

Respectfully,
DAVID W. POND,
Successor to LUCIUS W. POND.

DISSOLUTION OF COPARTNERSHIP

The firm of McClernan & Hynes is this day dissolved by mutual consent. The business of the firm will be liquidated by M. McClernan alone, No. 130 Liberty Street.

M. McCLERNAN,
D. HYNES.

DISCOUNT LISTS.

Hinges (Stanley Works) 1st. 10 to 50 c. each, 75c. and Butts, 1/2 Union Mfg Co.'s, 10 to 50 c. each. Bolt, File and Hinge and Butt List.—Contains all the lists and discounts that are used. Price \$1.00
Dayton & Lamberson, 97 Chambers St., N. Y.

AFTER SEVERAL YEARS OF SUCCESSFUL

experience in the construction of

New and Experimental Machinery,

we desire to invite the attention of manufacturers, and others wanting that class of work, to our facilities at Peekskill, N. Y., near the Hudson River Railroad depot, 1½ miles from N. Y. City.

ANDERSON BROTHERS.

Special Notices.

WANTED TO PURCHASE,
100 tons good Second-Hand T
Rails, 18 or 20 lbs. per yard.
Address, giving particulars,
PIPER & THOMPSON,
Lapeer, Mich.

Wanted.

A man to keep a set of books and clerk in hardware store, or would sell a half or whole of stock. None but a practical hardware man need apply and the best of reference must be given.

Address **S. L. McKISSON,**
Des Moines, Iowa.

For Sale.

Forehand & Wadsworth's Double-Action



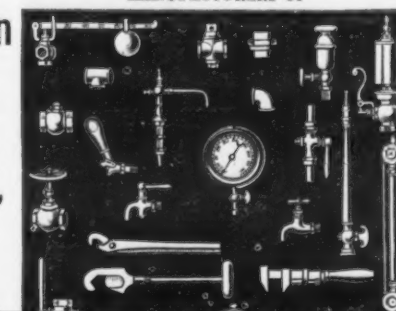
WROUGHT IRON FRAME.
Cast Steel Barrel and Cylinder.
32, 38 and 41 Cal.
SOLE AGENTS,
SCHOVERLING & DALY,
84 & 86 Chambers Street, New York.

Manufacturers of Standard and O.K. Revolvers, Charles Daly Guns. Agents for Wesson & Harrington, J. P. Clabrough & Bro., Importers of Gun, Gun Material, &c. Illustrated Catalogue furnished to only those whom we know to be in the trade.

EATON, COLE & BURNHAM CO.,

58 John Street, New York.
MANUFACTURERS OF

Wrought Iron
PIPE,
Cast Iron
LARGED PIPE,
Cast Iron
RADIATORS
and **BOILERS.**



Brass & Iron
STEAM
Gas & Water
FITTINGS.
PLUMBERS'
MATERIALS.

STEAM GAUGES, TOOLS,
And all Supplies used by Machinists, &c.

THE SELDEN DIRECT-ACTING
STEAM-PUMP
PAT. AUG. 2, 1870. DECEMBER 20, 1870
AND OCT. 21, 1873



COMBINING SIMPLICITY AND DURABILITY TO A
REMARKABLE DEGREE, THIS PUMP IS ADAPTED FOR ALL
PURPOSES FOR WHICH STEAM PUMPS ARE USED.
A. CARR, MANUFACTURER AND PROPRIETOR,
45 CORTLAND ST. NEW YORK.

John T. Lewis & Bros.,

No. 231 South Front St.,
PHILADELPHIA.



TRADE MARK.
MANUFACTURERS OF
PURE WHITE LEAD, RED LEAD,
Litharge, Orange Mineral,
Linseed Oil
AND PAINTERS' COLORS.



ATLANTIC
WHITE LEAD
PURE.
WARRANTED &
ROBERT COLGATE

TRADE MARK
The Atlantic White Lead and Lin-
seed Oil Company,
MANUFACTURERS OF
White Lead (Atlantic), Red Lead,
Litharge & Linseed Oil.
ROBERT COLGATE & CO.,
287 Pearl Street, New York.

Established A. D., 1777.
WETHERILL & BRO.,
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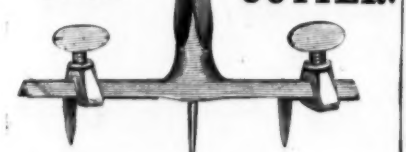
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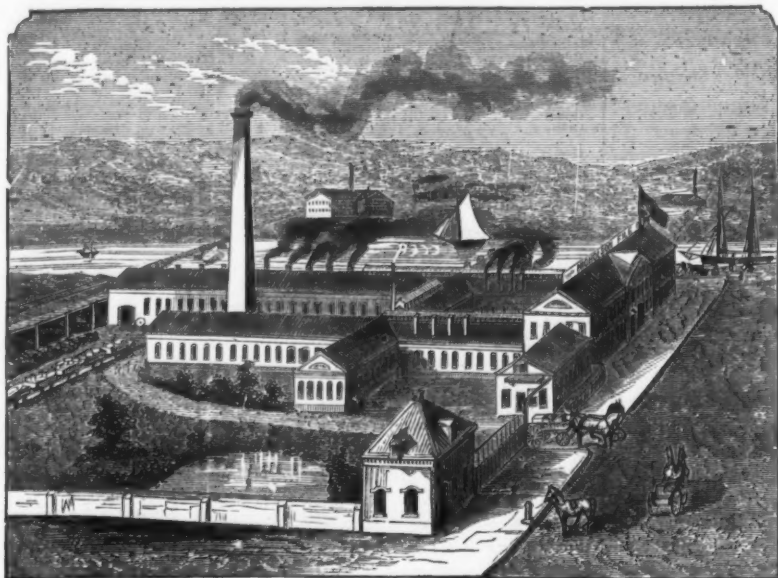


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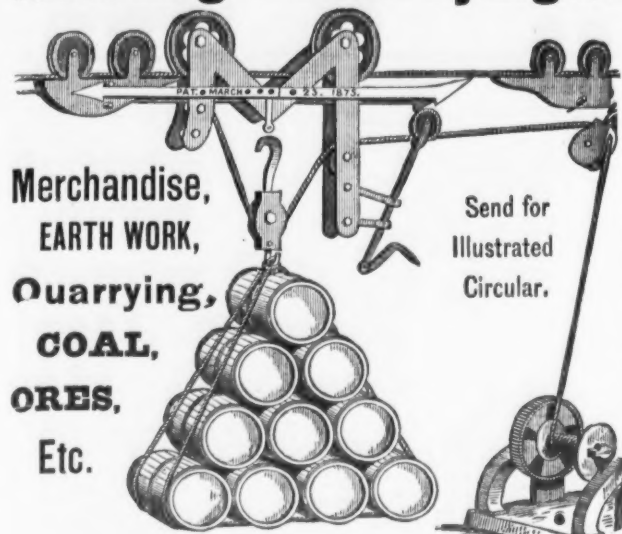
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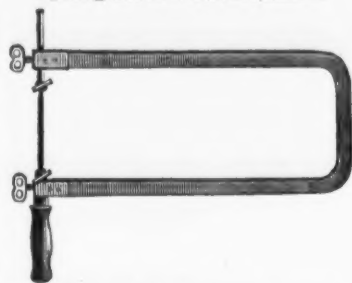
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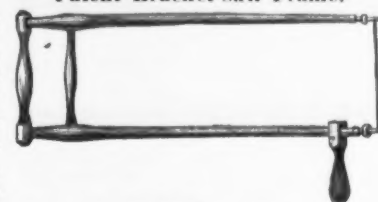
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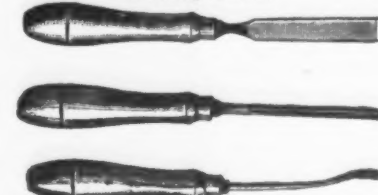
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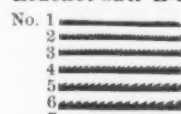
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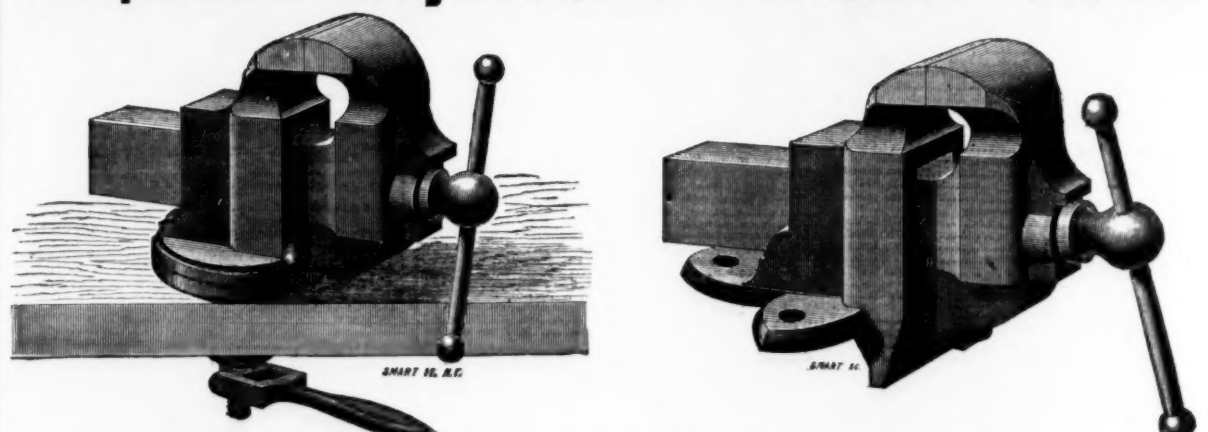
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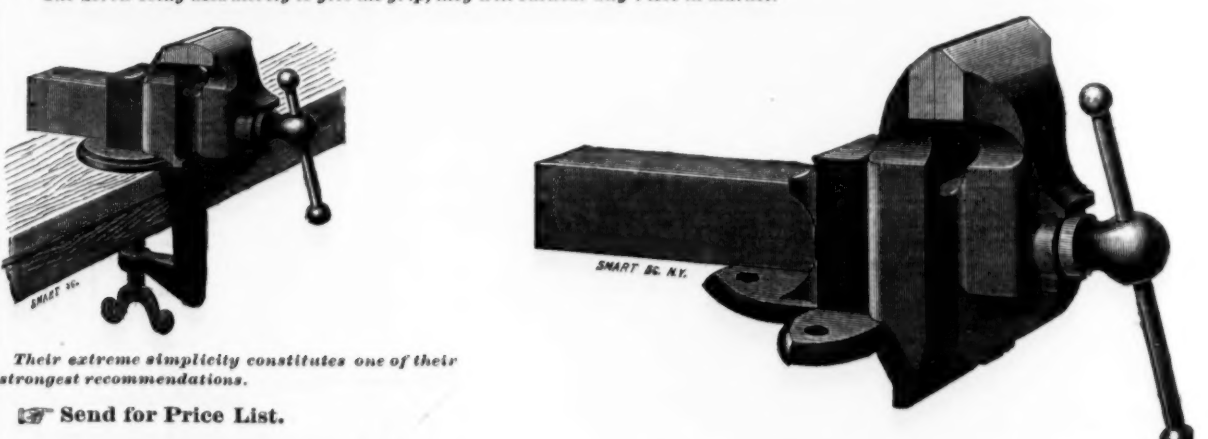
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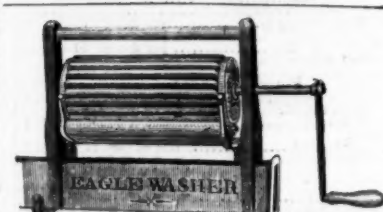
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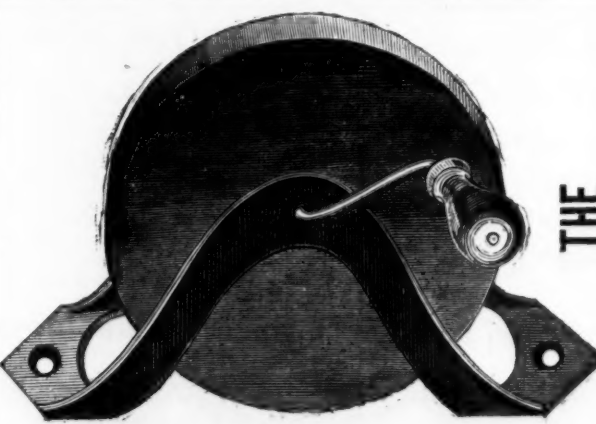
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LIST OF ILLUSTRATIONS.

Design No.	Plate No.	VILLAS.
1	1	Basement, 1st and 2d story plans of Frame Villa. Scale indicated on plate.
2	2	Perspective view.
3	3	Perspective view, Frame Villa House. Plans similar to Design No. 1.
4	4	1st and 2d story plans of a Brick Villa. Scale indicated on plate.
5	5	Front elevation of Villa. Scale indicated on plate.
6	6	Perspective view.
7	7	Ground and 2d floor plans of Brick Villa. Scale indicated on plate.
8	8	Perspective view.
9	9	1st and 2d floor plans of a Frame Villa. Scale indicated on plate.
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Design No.	Plate No.	COTTAGES.
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17	39	1st and 2d story plans of a Brick and Frame Cottage. Scale indicated on plate.
18	40	Perspective view.

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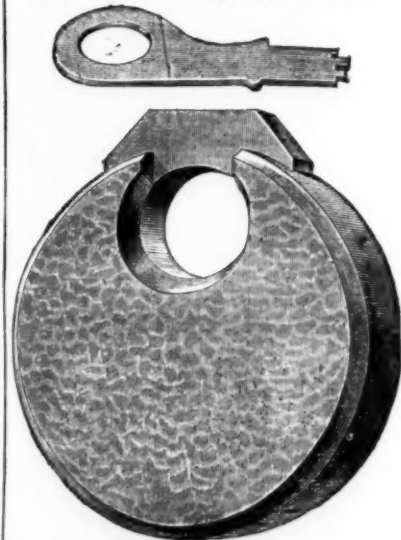
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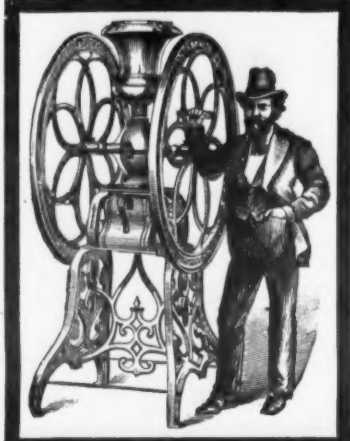
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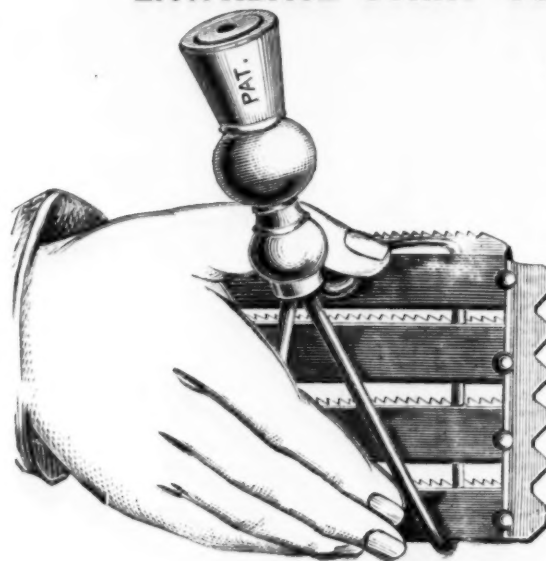
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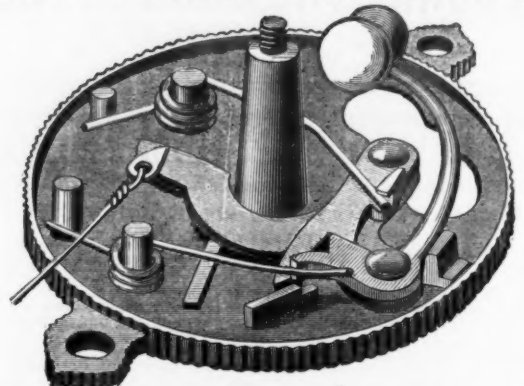
The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

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CONNELL'S PATENT TRIP GONG BELLS.



WITH BRONZED STEEL, POLISHED BRASS AND NICKEL PLATED CAPS.

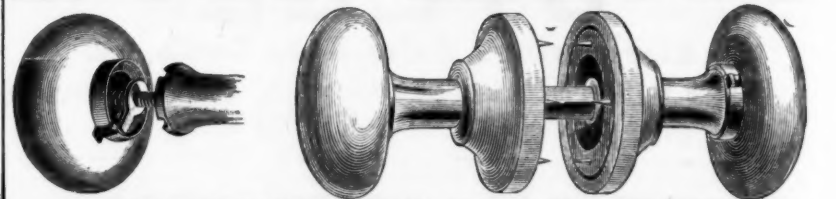
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Acknowledged by the Trade to be the Best Door Bells made.

Our Catalogue and "1876 Centennial Appendix" is now ready for distribution to patrons.

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THE WHIPPLE DOOR KNOB
 Is the only perfect Door Knob Attachment ever invented.

AWARDED A BRONZE MEDAL

At the American Institute Fair, in New York, for 1874.

NO SCREWS USED IN NECK OR ROSES.

Adjusts Perfectly to Doors of Different Thicknesses

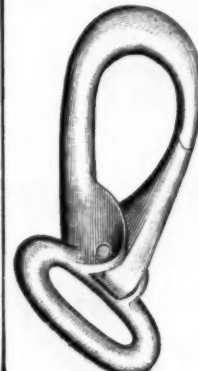
WITHOUT THE USE OF RINGS.

The attention of Architects, Builders and Carpenters is specially desired. Circulars fully describing the advantages of this Knob, with Price List, sent on application to

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Manufacturers of

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Greatly Improved in Style and Pattern.

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Screw Drivers of all varieties, Box Scrapers, Box Openers, Garden Hoes, Garden Trowels, Border Knives, Mining Knives, Fish Turners, Butter Knives, Cake Turners, Cleavers, Hammers, Carpet Stretchers, Tack Claws, Marking Awls, Carpenters' Awls, Belt Awls, Ice Awls, Carriage Jacks, Nail Sets, Bush Hooks, Ice Axes, Ice Tongs, Patent Moure Trape Vegetable Slicers, Bit Braces, Butts and Spiral Springs, Ferrules, Ham Tryer, Ham Stringers, Oyster Knives, Cold Chisels, Handles, Solid and Prick Punches and

IMPLEMENT SCREW DRIVERS.

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These Freezers have been in use since 1860 with the most flattering results, and they have well earned the reputation of being the BEST ICE CREAM FREEZER ever introduced, and have been awarded the highest premiums. No expense is spared to render them perfect, improvements being constantly introduced in their manufacture: they are simple in their construction, containing no complicated machinery, are not liable to get out of order, and perfect in operation. They are made in the most durable and substantial manner; none but the best materials are used in their construction, and the mechanical arrangements are such that they will freeze Cream, Fruits or Water Ices in the shortest possible time.

DOUBLE ACTION FREEZER.

SIZES AND PRICES.	
10 quarts.....	\$15.00
15 ".....	\$20.00
25 ".....	25.00
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COG WHEEL FREEZER.

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2 quarts.....	\$3.50
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For sale in New York at minimum rates by Wholesale Dealers in House Furnishing Goods generally.

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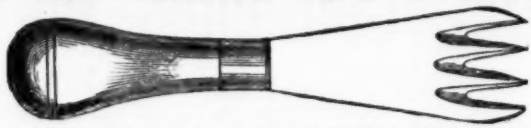
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No Mistake about it this time.

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Saves Ice, saves Ice Box, saves Labor. Made of Cast Steel thoroughly tempered. Manufactured by
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Also Manufacturers of
CAPEWELL'S GIANT NAIL PULLER, THE NOVELTY ICE BREAKER,
ROSE WOOD, MAPLE AND METAL KEY FAUCETS.



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HAMMERED, HAMMER POINTED, POLISHED & BLUED HORSE NAILS,

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Orders promptly filled at lowest market rates.

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Pointed, Polished & Finished Horse Shoe Nails

Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

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Successors to

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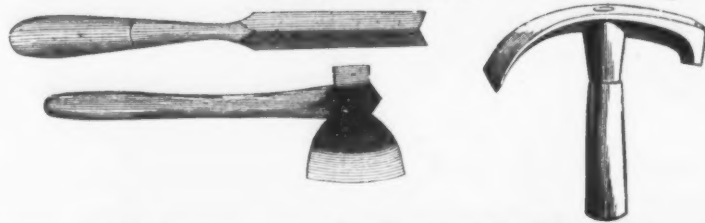
At the Old Stand, 136 Mill St., ROCHESTER, N. Y.

Sole Manufacturers of the

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Carpenters' Coopers' and Pump Makers' TOOLS.



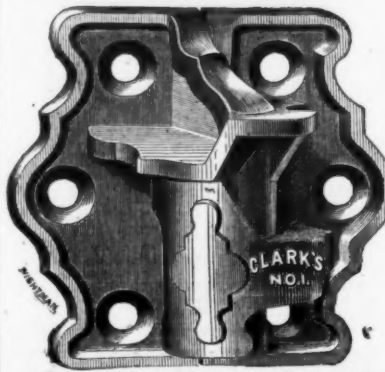
Large Knives and Barrel Machinery.

All Tools made by us are stamped D. R. BARTON & CO.,

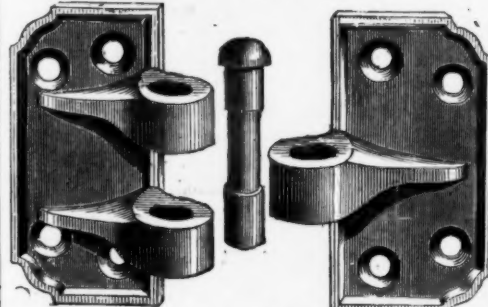
All goods stamped D. R. Barton & Co., are made at the Old Works, and by the old men, from the B English Steel, manufactured for us by Thos. Firth & Sons and Wm. Jesson & Sons, and fully warranted. Goods stamped D. R. Barton are not made at the Old Works of the company but by a new stock company formed about the time of Mr. Barton's decease.

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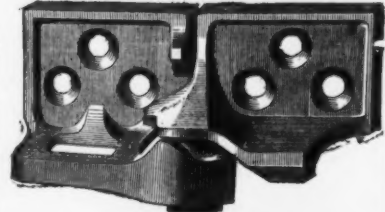


NEW PATENT, No. 1 Hinge.



No. 1 Upper Gate Hinge.

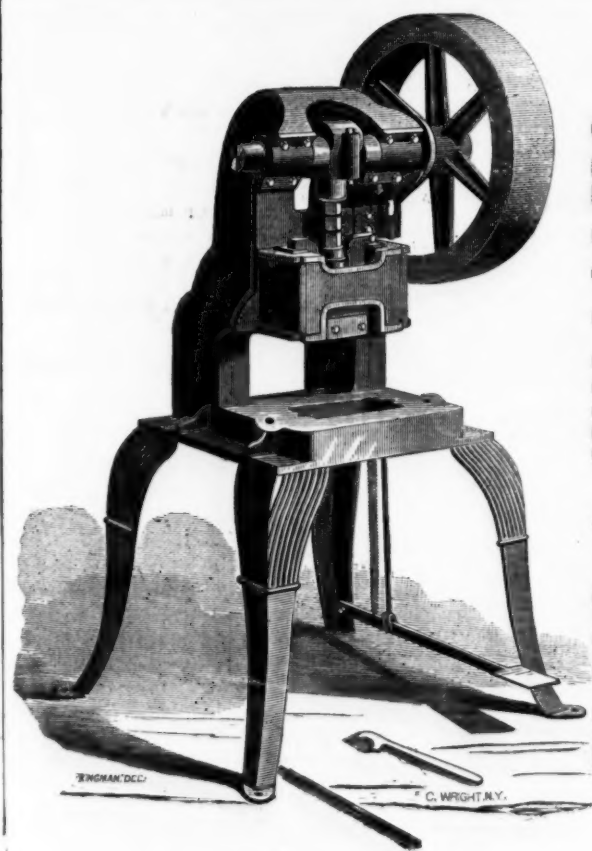
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Two First Premiums awarded by Franklin Institute Exhibition of 1874.

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Manufacturers of Latest Improved Machine Tools, Rotary Shapers, two size, Iron Planers, all sizes, Horizontal Drill Attachments, for upright power drills, Self-feeding Portable Drills, hand or power, Expansion Boring Bars, five sizes, Universal Slide Rest, for taper work, Twist Drill Sharpening Machines, automatic and adjustable in every direction, Noiseless Friction Gears, for transmitting up to thirty horse-power. Send for Descriptive Circulars.



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Manufacturers of all kinds of PRESSES, DIES, & SPECIAL MACHINES, FOR WORKING SHEET METALS, &c.

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Curry Comb.

The Best yet Invented.
CHEAP AND DURABLE.
Is Pleasant to the Horse, and does not injure the Brush.

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We call the attention of Hardware Dealers to our Double Curry Comb, comprising a fine and coarse side; or virtually two combs in one. It is useful, durable and novel, and needs no argument to convince any one of its practicality. It sells on sight, and is bound to supersede all other combs. We want one reliable dealer in each state or large city to handle it. Correspondence solicited.

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TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others. If, after a fair trial, it does not, we will take it off at our own expense.

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CLOCK AND DETECTOR,

AND
Buoy's Patent Counter Scale,
No Nest of Weights.

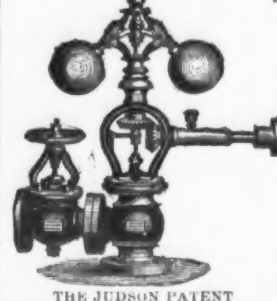
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THE JUDSON GOVERNOR.

It is a common method to advertise Governors without cost, unless satisfactory to the customer, and then charge High Prices for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacks durability. The Judson Governor is guaranteed to be not only the best Governor of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

Reduced Price List, JANUARY 25th, 1876.

For dimensions of Governor, see Illustrated Price List.



THE JUDSON PATENT

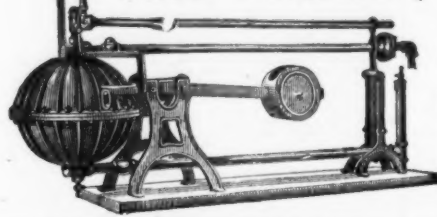
Improved Steam Governor.

No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

Size, In.	Plain.	Right Fly, In.	Extra for Lever.	Stop Valve.
1 1/2	\$17.00	\$19.00	\$1.00	..
2	19.00	21.00	1.00	..
2 1/2	21.00	23.00	2.00	\$5.00
3	23.00	25.00	2.00	6.00
3 1/2	25.00	27.00	2.50	8.00
4	27.00	29.00	3.00	10.00
4 1/2	29.00	31.00	3.50	12.00
5	31.00	33.00	4.00	14.00
5 1/2	33.00	35.00	4.50	16.00
6	35.00	37.00	5.00	18.00
6 1/2	37.00	39.00	5.50	20.00
7	39.00	41.00	6.00	22.00
7 1/2	41.00	43.00	6.50	24.00
8	43.00	45.00	7.00	26.00
8 1/2	45.00	47.00	7.50	28.00
9	47.00	49.00	8.00	30.00

The Albany Steam Trap.



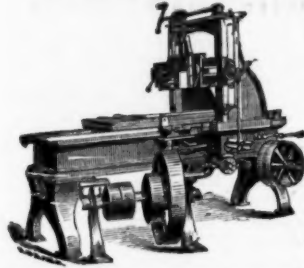
This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,
Albany, N. Y.

The Pratt & Whitney Co., Hartford, Conn.,

Have constantly on hand and making

Drop Hammers

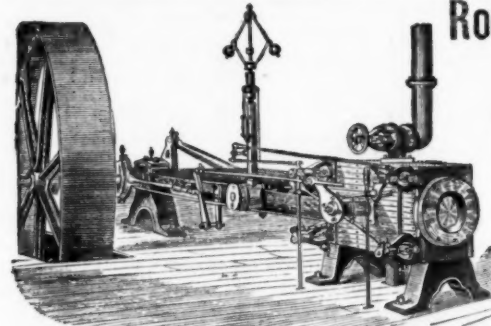


Of recently Improved Construction. Pony Trip Hammers, Back smiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

Robt. Wetherill & Co.
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Corliss Engine
BUILDERS.

Shafting & Gearing.
Boiler Makers.



THORNE, DeHAVEN & CO.

21st Street, above Market,
PHILADELPHIA.

DRILLING MACHINES.

PORTABLE DRILLS. Driven by power in any direction, self-feed and convenient adjustment.

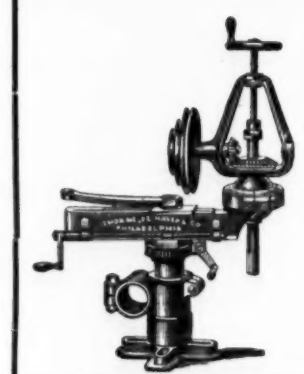
RADIAL DRILLS. Self-feed—large adjustable box table—separate base plate, every convenience.

VERTICAL DRILLS. Self-feeding—of new and improved designs.

MULTIPLE DRILLS. For boiler work, etc., 2 to 20 spindles, fed and returned by power or hand, together or separately.

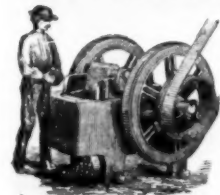
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SPECIAL DRILLS. For special work. Gun Blank Drills, Coal Drills, &c., built to order.



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New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect MACADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS. It is extensively in use in MINING operations, for crushing

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Also for crushing QUARTZ, FLINT, EMERY, CORUNDUM, FELDSPAR, COAL, BATTLES, MANGANESE, PHOSPHATE ROCK, PLASTER, SOAPSTONE, &c.

For Illustrated Circulars, and particulars, address,
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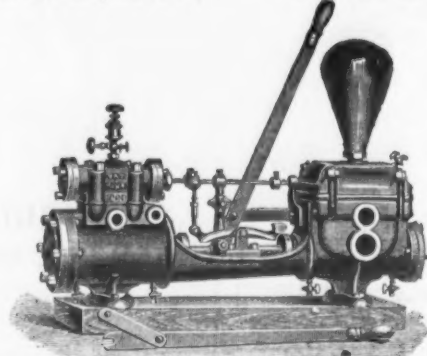
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KNOWLES STEAM PUMP WORKS,
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WAREHOUSES:

14 & 16 Federal Street, Boston,

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Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

FIRE PUMPS a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best. Every machine furnished under a complete guarantee.

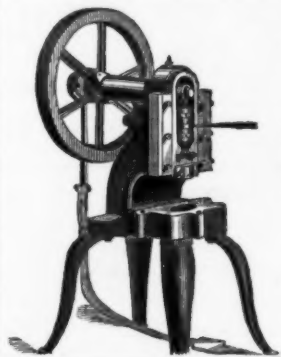
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COSTING FROM \$16.00 TO \$75.00.

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Punching Presses.

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I warrant every part of this Machine to stand the shock of the wheel running at 125 revolutions.

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For Sale by all the principal Hardware Dealers.

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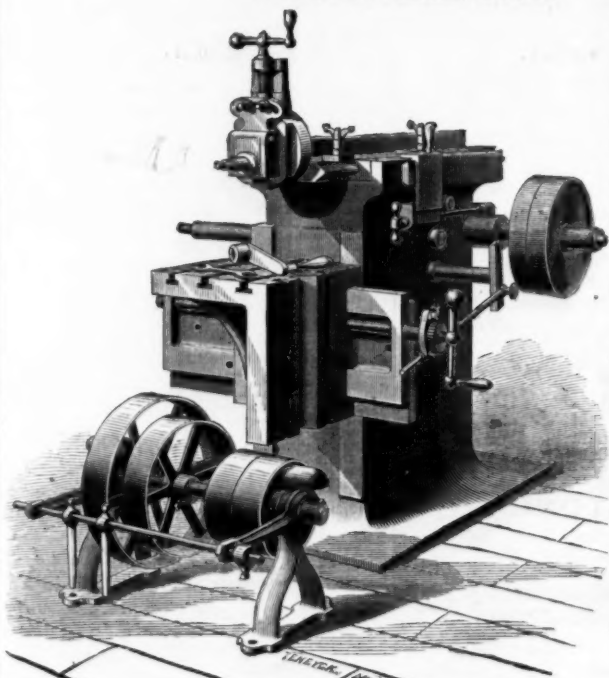
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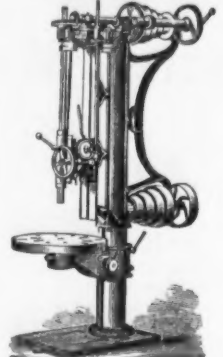
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WOLCOTTVILLE, CONN.



Any length of stroke from 3/4 to 24 inch in length, while machine is running with perfect uniformity of speed of cutting tool. Automatic cross feed of 19 inch and 16 inch, from top of table to bottom of slide when table is down. Send for Circular and Price List.

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And other First-Class Machinists' Tools.

Machinists' Tools.

Engine Lathes, Planers, Upright Drills,
Hand Lathes, &c.,

Of best quality, in stock at low prices.

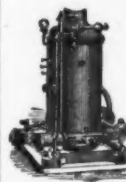
LATHE & MORSE TOOL COMPANY,
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IMPROVED Engine Lathes

SCREW MACHINES, &c.

JONES, LAMSON & CO.,

Windsor, Vt.



The Whitmore Engine.

SAFEST, CHEAPEST & BEST.

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Sole Manufacturers

Engines, Boilers and
Steam Pumps.

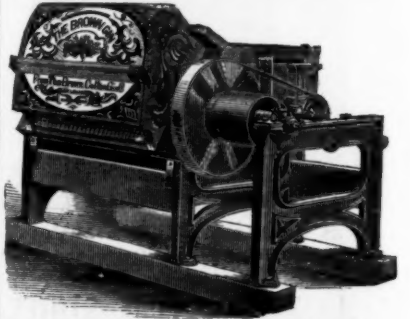
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Unequaled for Durability, and Adapted to all weights and speeds.

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The Brown Cotton Gin Co.

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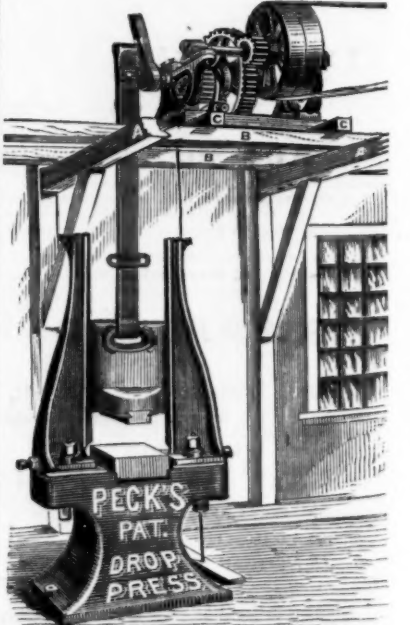
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COTTON GINS,

With or without

Self-Feeding Attachment & Condenser.

Cotton Gin Saws, Ribs and other Gin materials. Also
Albertson's Segment Screw Cotton, and Hay
Press. Send for Circular.



I have the largest and best stock of Drop Press Patterns in the country—suitable for Forging, and all kinds of Sheet Metal work.

WHY THE BEST:

It requires less power, works faster, gives a harder blow with same weight of hammer, the rebound of the hammer is caught without lessening the force of the blow, the blow is uniform and not affected by variations in the speed of the driver. It is always in order. The Drop Press is a specialty.

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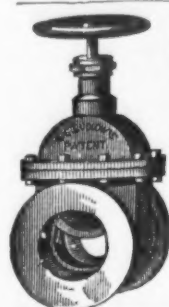
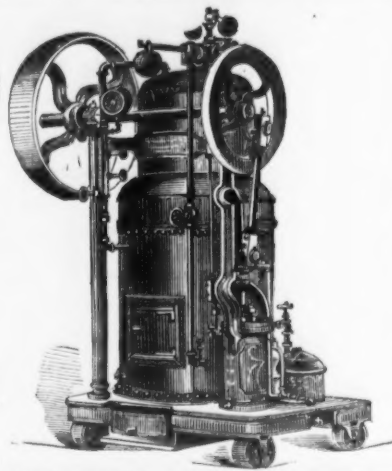
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THE
Shapley Engine

Patented Feb. 10, 1874.

COMPACT,
PRACTICAL,
DURABLE,
ECONOMICAL.
\$200.00.Cheaper than any Engine offered of
the same capacity.

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SHAPLEY & WELLS,
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JAMES MOORE,

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Engineer, Machinist, Founder and Boilermaker

CASTINGS of every description.

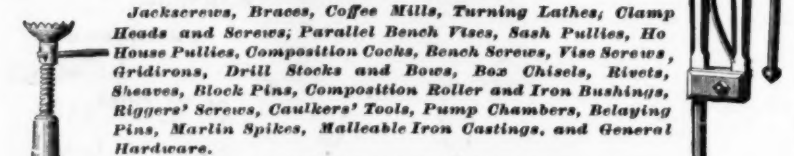
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Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or
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AND MILLWRIGHTING IN GENERAL.BOILERS—FLUE, TUBULAR AND CYLINDER, and all kinds of
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SOLID BOX VISES.

With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp
Heads and Screws, Parallel Bench Vises, Sash Pullies, Ho
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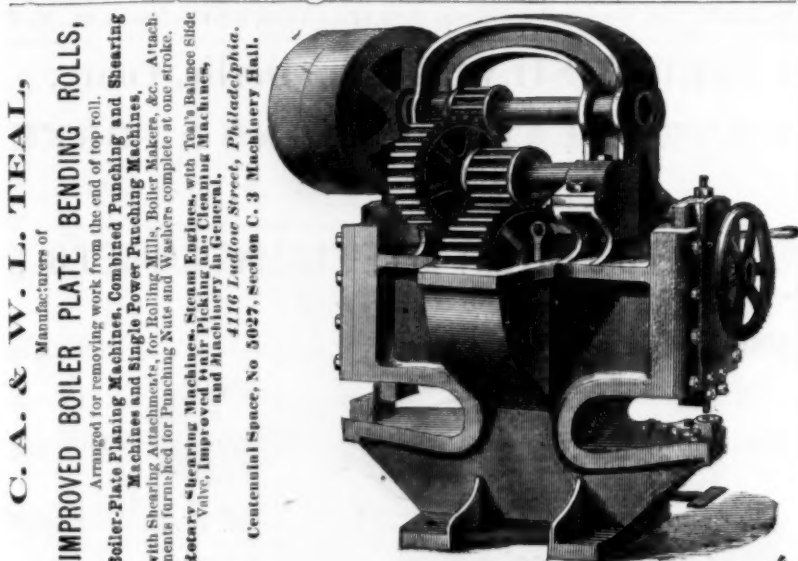
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ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order

C. A. & W. L. TEAL,
Manufacturers ofIMPROVED BOILER PLATE BENDING ROLLS,
Arranged for removing work from the end of top roll.Boiler-Plate Flanging Machines, Combined Punching and Shearing
Machines and Single Power Punching Machines, &c. Attach-
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Rotary Shearing Machines, Steam Engines, with Tread Balance Slide
Valve, Improved Pickling and Cleaning Machines,
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Centennial Space, No. 5027, Section C. 3 Machinery Hall.

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Established 1848.

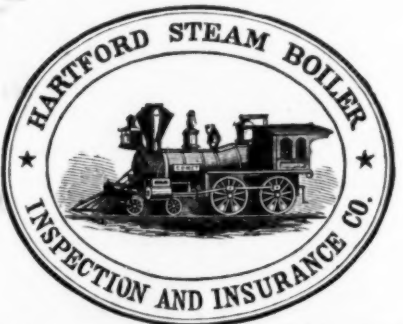
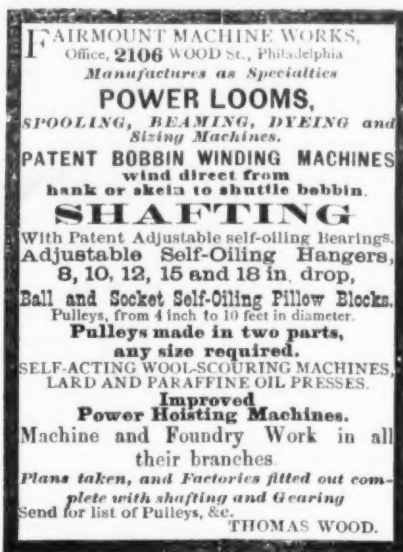
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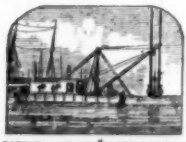
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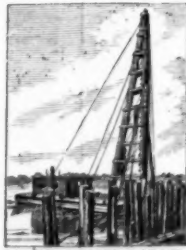
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REPORT OF JUDGES

In Department F, Group 3, at the 44th
Exhibition of theAMERICAN INSTITUTE,
Held in the City of New York, Oct., 1875.No. 318, Drawing, Drop &
Punching Presses.THE STILES & PARKER PRESS CO.,
Of Middletown, Conn.

The machinery exhibited by these makers is of a
character that calls for special commendation. In
addition to their well known punching presses, to
which a new feature has been added in a press ad-
justable to an inclination for discharging work left
above the die, there are exhibited by them a com-
bined punch and shears, a drawing or blanking press,
and a drop.

In all these there is shown the highest mechanical
culture, applied to meet every practical requirement,
to avoid every practical difficulty, and to enlarge the
range of application of the machines, by devices
which are at once simple, elegant, and effective.

Your committee would unhesitatingly recommend
for this exhibition the "Medal of Progress," but
find such award debarred by the rule of the Institute,
forbidding such award unless a Silver Medal has
been previously awarded. We, therefore, respect-
fully recommend the award of a Silver Medal.

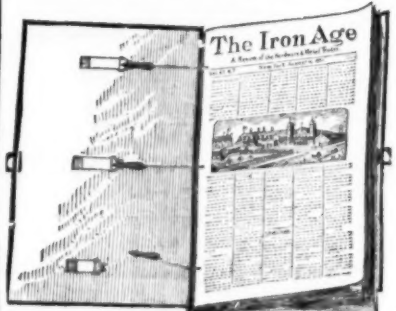
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A true copy from the Report on file.
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Steam Pump.Highest Premium awarded by
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For Simplicity, Economy of
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Practically impossible to
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FOR THE IRON AGE.We have made arrangements to furnish Kowa's
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Full Cloth 150
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The above are all in black, which is the most ser-
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shades. The name of the paper is stamped in gold
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XX.....	38c	D.....	15c
X.....	35c	E.....	13c
A.....	30c	F.....	11c

Note:—The above are my standard mixtures, and have given satisfaction wherever used, but I am prepared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

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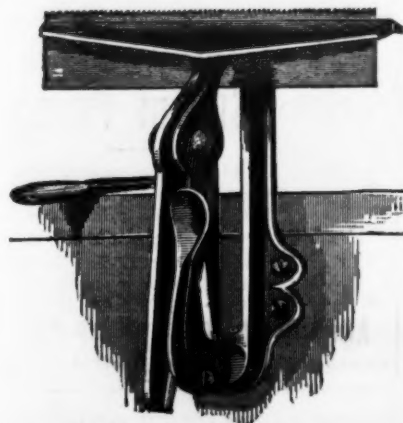
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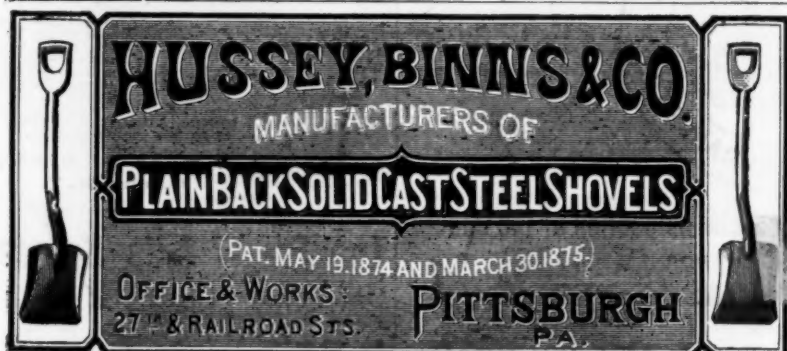
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